COAL AGE

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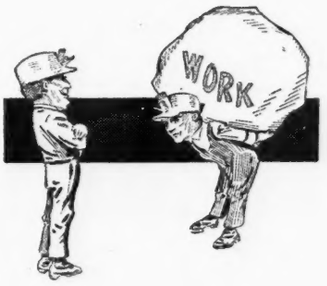
To the Beginner

By Berton Braley

Written expressly for Coal Age

So you think the work is heavy
In the coal mine dark?
Well, it ain't no bloomin' picnic
In the public park;
But you'll find it ain't so awful
As it first appears,
Though it sure is mighty wearin'
For the FIRST TEN YEARS.



To the guy who's just beginnin'
It's a durn tough job,
To be underground a toilin'
With the coal-streaked mob;
But when you're hardened to it
Why, the prospect clears,
Though it's mighty lumpy pickin'
For the FIRST TEN YEARS!

You'll find the work is dirty
An' the coal is rough,
An' the pitboss has a manner
That is harsh an' gruff;
With the perspiration drippin'
From yer nose an' ears,
You'll think your job's a hard 'un
For the FIRST TEN YEARS.

An' will it grow more easy
As the long days flit?
Well, if it don't get easy
You'll get used to it;
So drill away contented
An' we'll give three cheers,
Though it's hard to be a miner
For the FIRST TEN YEARS.

Ideas and Suggestions

Environment as a Factor in Individual Efficiency

Do you mine owners realize that environment is a great factor in the cost of your operations? Have you ever looked over your men to see if you are not allowing some of the best of them to grow stale for lack of a change or promotion to increased responsibility?

Listen to this!

For ten years a man held a relatively important position as manager at one of the offices of a big coal-mining concern. He was finally promoted and placed in the general office. His duties required him to visit the mines in the capacity of a general inspector to observe and study conditions and especially to see that too many men were not employed in any department.

One day he visited the office where he had been manager for so many years. One of his old men was now in charge. The rest were in the same relative places. The desk arrangement was the same and there were the same number of men.

Something struck him as strange amid all the familiar scenes. What was it! The men didn't seem to be busy. Why? It seemed to him he used to keep them busy. Now there seemed to be too many of them. How was that? He could remember that some of them used to have to stay at night to get out the work. He observed that a few were rolling cigarettes and for periods of twenty or even thirty minutes there were general conversations about politics, war or religion—all foreign to the work in hand. What was the matter with the place? It was just the same as he left it and yet it didn't look right.

The Value of System

A week later it dawned on him. In the general offices he observed there was a systematic arrangement of work. The men worked shorter hours, got away in the summer months in time to see most of the ball game and had Saturday afternoons off—but during work hours they WORKED. Smoking was not allowed and no general conversations were in order. There was no night work. A vast amount of work was done easily and the men all seemed pleased in doing it.

Like a flash the experience of changed environment bore fruit. He saw what was wrong in his old office. The work hours there were too long and there were too many men. He had been blinded by too close contact coupled with the lack of broader experience.

Just then the general manager rang for him and said:

"We are spending too much money at X mine. Too many men there. Looks like the office force is top heavy. You worked there a long time and ought to know what is the matter. See what you can do."

It was easy for the inspector. Already awake to the occasion it required but little study to accomplish reductions in force which previous to his change he would never have considered possible. New rules and new hours were invoked. The saving per month amounted to more than his own salary. He took an inventory of his former self and how he used his own working hours. Results were seen in evidence. On one trip he saw something entirely out of his line but indirectly affecting operations which seemed worth looking into. He told the "G. M.," who was able to work out a monthly saving of several hundred dollars for the concern as the result of it.

This man from being a mere department head soon became a valuable officer to the concern and saved his employers his own salary many times over during a year. BUT REMEMBER, his talents were buried for years and might never have been developed except for a change in environment.

There's the essential fact of the story—and maybe it will serve to point a moral.

You may have just such a man in your employ. Give him a change and try him out in a new position. You know responsibilities gravitate to the fellows who can shoulder them. Those who can't get under responsibilities you don't really need anyway. The ONE or TWO you may discover who CAN, will make our effort worth dollars to you.

Don'ts for Coal-Mine Employees

The following instructions and safety regulations were taken from an interesting little book of rules gotten out by the Susquehanna Coal Co., of Wilkes-Barre, Penn. This plan of instructing employees is one that might be imitated to advantage by coal companies in every field.

1. Don't forget that the safety department is intended to assist you in protecting yourself and others, but cannot take your place.
2. Don't forget that we will appreciate any suggestions that may tend to further the safety of employees.
3. Don't try to get on a cage or car before it gets there or after it has started to leave, and use particular care in and around shafts.
4. Don't forget that it is safer to walk than to ride where separate travelingways are provided.
5. Don't try to couple or uncouple cars when in motion. It is dangerous, and you are breaking the mine law as well as a company rule.
6. Don't forget when going up or down a travelingway, or about to cross lifts or levels, to stop, look and listen.
7. Don't attempt to couple cars on the short side of a curve.
8. Don't attempt to perform unfamiliar work without previous instruction.
9. Don't stand within swing of tools in the hands of other workmen, nor in front of rivets, bolts or nuts being chiseled off.
10. Don't forget that where there is a live wire there is danger.
11. Don't think because a wire is broken it is harmless; if necessary, remove it with sticks or boards.
12. Don't fail to look out for loose or torn clothing and gloves when working around moving machinery.
13. Don't neglect, when removing cotton from a lamp, to make sure that it is thoroughly put out, and do not throw matches away carelessly.

14. Don't lose your head in case of accident; try to remember the right thing to do—it may save some serious result.
15. Don't fail to report any unusual happening about the colliery or in the mines; it will save future trouble and will be appreciated by your foreman.
16. Don't stand in back of cylinder heads or in front of a crank while engines are in motion.
17. Don't talk to any engineer while his attention is required by his machinery.
18. Don't touch electrical equipment unless it is in your line of work—it is dangerous.
19. Don't fail to observe all rules relating to electrical equipment, whether in your line of work or not.
20. Don't be satisfied with a "good enough" hitch—make it right.
21. Don't allow sharp tools of any kind to lie around carelessly; don't fail to put them in their proper places.
22. Don't fail to observe any warning given you by any person that may affect your own or another's safety.
23. Don't under any circumstances go into any unnecessary dangers.
24. Don't use tools which need dressing or repairs.
25. Don't fail to have all scaffolds erected in a secure and safe manner.
26. Don't fail to remove all dangers from hanging icicles.
27. Don't fail to keep a constant lookout for danger when walking about railroad and mine tracks.
28. Don't fail to obey the rule prohibiting smoking.
29. Don't cross over a trip of cars—walk around it.
30. Don't fail to observe all rules for the handling of explosives.
31. Don't misuse your safety lamp—it is your safeguard.
32. Don't fail to examine your safety lamp and assure yourself that it is in good condition.
33. Don't fail to extinguish the light at once and return your safety lamp to the person in charge; if it is injured or defective, reporting same.
34. Don't remove an accumulation of gas by brushing it, where it is practicable to be removed by bratticing.
35. Don't fail to immediately extinguish a feeder of gas that you may ignite; if unable to do so, notify the official in charge at once.
36. Don't fire any blast when starting batteries or chutes before notifying the men on the gangway.
37. Don't start a battery when blocked 6 or 8 ft. above the battery. Notify the official in charge of said condition and await his orders.
38. Don't travel on any gravity plane or slope while cars are being hoisted or lowered.
39. Don't fail to immediately report to the official in charge anything you may discover wrong that may lead you to suspect danger to yourself or others.
40. Don't fail to observe all provisions of the mine law.

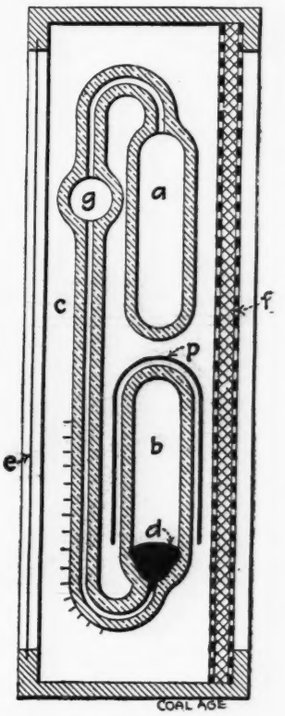
The Guasco Toximeter

The *Journal de Physique Elementaires* recently contained an interesting article, by Monsieur Abel Buguet, on a new type of indicator made by Messrs. Guasco & Co., Paris, France, and termed the "Toximeter." Its purpose is the indication of the amount of carbon monoxide in air, particularly with relation to those amounts which may prove dangerous to human life.

The chemical analysis of the air by the ordinary methods of procedure are more useful in the laboratory than in commercial practice, and hence various attempts have been made to reduce such measurements to processes that can be carried on, as far as possible, continuously and automatically. In 1889, Pitkin and Niblett used a mercury thermometer, the reservoir of which was covered by finely divided platinum. This was installed adjacent to a second thermometer identical with the first, except that its bulb was not platinized. In this arrangement, advantage was taken of the fact that finely divided platinum becomes heated in the presence of carbon monoxide, and the difference of temperature of the two thermometers was sensibly proportional to the percentage of carbon monoxide present. Unfortunately, a dangerous amount of carbon monoxide only registers a difference of one-tenth of a degree in the readings of the two thermometers, and this is too small a difference for commercial practice.

Later, Monsieur Racine, applying the same property of platinum, obtained in the presence of carbon monoxide a temperature that caused the explosion of a filament of guncotton, the rupture of which allowed a bell to be rung. This, also, is hardly suitable for practical use, one reason being that there might be the danger of the filament not being replaced after use. Monsieur Guasco, however, has now utilized the same property of platinum, applying it to one of the bulbs of a differential thermometer similar to that of Leslie.

The device is illustrated in the accompanying diagram and consists of two glass bulbs *a* and *b* connected by a capillary tube *c*. A smaller bulb *g* is blown near the top of the capillary tube, as shown in the cut. The purpose of this bulb is to prevent the colored liquid that is forced into the capillary tube by the expansion of the air in the bulb *b* from passing over into the bulb *a*.



THE GUASCO TOXIMETER

Both the bulbs *a* and *b* contain air. The bulb *b*, as shown in the figure, is covered with a thin film of finely divided platinum *p*, which absorbs the carbon monoxide gas when present and heats, thereby raising the temperature of the air in the bulb *b* above that in the bulb *a*. The bulb *b* contains a small portion of colored liquid, *d*, which, by the expansion of the air in this bulb, is forced upward in the capillary tube *c*. This tube is calibrated to show the difference of temperature between the two bulbs *a* and *b*.

In this instrument, advantage is taken of the greater expansion of the air in *b*, due to a very slight difference of temperature between the two bulbs. Also, as in the ordinary thermometer, the effect of the expansion in the bulb is greatly magnified by the capillarity of the graduated tube *c*. The instrument is shown inclosed in a case, on one side of which is a glass window *e* for observing the reading of the thermometer; while on the other side is a porous partition *f*, which prevents strong air currents from striking the bulbs of the thermometer, but permits the diffusion of gas from the outside into the case.

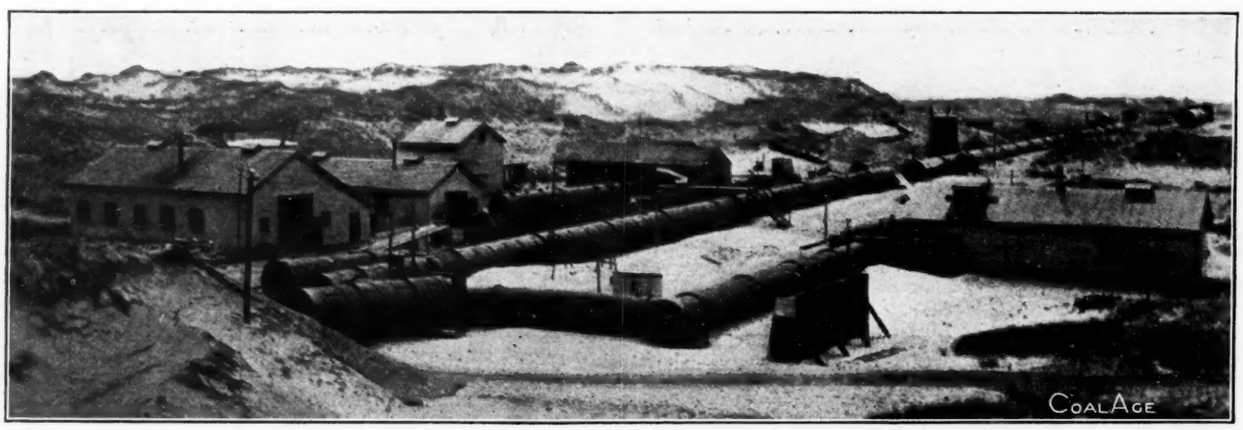
It has been suggested to make this instrument automatic by replacing the colored liquid with mercury, which, ascending in the capillary tube, would close an electric circuit at a certain point or danger line. By this means, a small bell could be rung or an electric lamp made to glow and give the alarm of the presence of the gas.

A Visit to the British Experimental Station at Eskmeals

By Samuel Dean*

SYNOPSIS—The British Experimental Station accepts many of John Verner's conclusions, as published in these columns. There is an inrush of air, as well as an outrush probably throughout the duration of all explosive phenomena. The article states that narrow workings are more subject to explosions of coal dust than wide, and that the end of a blind heading is freer from that menace than a point along the rib.

A party left Blackpool by train for Fleetwood and sailed for Barrow on one of the most lovely days of an English summer. All stayed overnight in Barrow, and the rest of the party, not being interested in mining, I finished the last part of the journey alone, traveling up to Eskmeals around the edge of the Cumberland mountains, where Lakeland, the famous holiday resort, is situated, once the home of Wordsworth, Ruskin, DeQuincey and others.



The Experimental Galleries at the Eskmeals Station

The experimental station is not in an outlandish spot, being only 10 min. walk from the railway station. It is on the coast or west side of the railroad, located among sand hills. On the east side there are beautiful farms. The residents are accustomed to loud reports as Messrs. Vickers test their big guns along the shore. Sea fowl and game abound in the district.

The station is well equipped; there is excellent housing accommodation for the scientists, with well furnished offices, laboratories, etc. There are two tubes, one 800 ft. long, 7 ft. 6 in. in diameter, the other 400 ft. long and 3 ft. 3 in. in diameter. They are the same galleries that were used at Altofts by the Mining Association of Great Britain, have been taken over by the Home Office Department of the British Government.

Shale Dust of Value Where Gas Is Present

Recent efforts have been made to explode a one-to-one mixture of coal dust and shale dust in atmospheres containing 1, 2, 3, 4 and 4.5 per cent. of methane, and although I am not permitted to state the results at this time, I am glad to be able to say that the efficacy of shale dust as a preventive of explosions has been further proved, and that an explosion of firedamp alone is trifling compared with an explosion of coal dust.

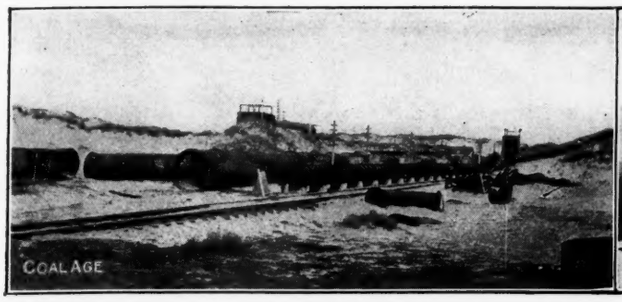
As a special favor, Doctor Wheeler, who has charge of the station, prepared an experiment, which I had suggested, to prove or disprove the counter-current theory; and I may say at once that Mr. John Verner is quite correct. Mr. Verner's views may not be well understood, and on that account they are given here. He made numerous observations at close range, and this was what he found:*

When a shot is fired, say at the face of an entry, the air and what dust there may be present are driven away from the face by the expansive force of the heated and burning gases from the shot. This expelling force, however, is instantly checked apparently through the effects of a growing depression at the face, caused by the rapid cooling of the gases there and their consequent rapid shrinkage in volume. This depression is immediately filled by an inrush or backrush of air along the bottom toward the face, while the heated gases in the upper part of the entry keep on their course outby. The force and volume of the inrush of air along the bottom vary considerably in the different observations, the conditions in this respect being evidently determined by the size of the depression near the face. In view of this it might be rightly concluded that, if the inrush of air along the bottom is of sufficient volume, and carries with it sufficient dust, and if it reaches the heated gases near the face before they are cooled below the ignition point, then inflammation with explosive effects may take place.

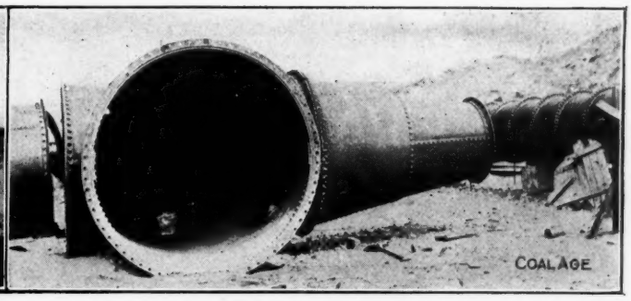
The late Sir F. A. Abel's opinion was that a dust explosion was really made up of numerous distinct and local explosions which follow each other so quickly that the explosion may be considered continuous, and facts developed since he (Sir F. A. Abel) made his experiments and investigations show the correctness of his views in that respect. Sir Frederick further concluded that the same conditions which cause the explosive ignition of the dust in the first local explosion must be present to cause the explosive ignition of the dust in each subsequent local explosion. That being true, it follows that, if explosive inflammation is effected in the first local explosion by the injection of the air-and-dust mixture into the highly heated or burning gases, explosive inflammation must be caused in every subsequent local explosion in the same manner.

*Delagua, Colo.

*"Trans.," Inst. Mining Engineers, Vol. XLVI, Part 2.



THE OPEN ENDS OF THE TUBES



THE MOUTH OF THE 90-IN. TUBE

The question might be asked: Can the air inrush exist in the face of an explosion, and can it, against an apparently superior force, under seemingly extremely adverse conditions make sufficient headway, to produce the effects claimed? It seems difficult to believe, but nevertheless it has been shown that under favorable conditions the explosion of the shot and the starting of the air inrush may be practically simultaneous occurrences. In one of the Altofts experiments the presence of the air inrush was noted within a twentieth of a second after the explosive wave had passed a given point.

It might be difficult to establish by direct proof the presence of air inrushes during the progress of an explosion, but their existence can be established indirectly, and I believe that it can be readily shown by tests at Altofts, or at any other experimental mine or gallery, that the occurrence of a dust explosion is not probable if the conditions controlling the inrush of air are unfavorable.

PROVING THE INRUSH THEORY

The experiment mentioned above was carried out in the small gallery 3 ft. 3 in. in diameter. A mixed dust was used containing 70 per cent. coal dust and 30 per

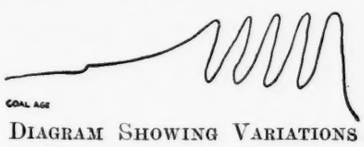


DIAGRAM SHOWING VARIATIONS IN PRESSURE DURING EXPLOSION

cent. incombustible dust (fuller's earth); this was done to slow down the explosion and allow more time for observing the air actions at the mouth of the gallery. Across the mouth of the tube a board, 6 in. square, was supported by four coil springs, and from the board a rod 6 ft. long projected out into the open. There was a white mark on the rod, which passed through a stationary upright painted black. The rod moved back and forth as the air movements forced the board outward or inward. Half a pound per linear foot of mixed dust was strewn along the gallery to within 20 ft. of the mouth, and 1½ lb. of black powder, stemmed with 8 in. of dry clay, was fired from the cannon placed 50 ft. from the closed end of the gallery.

THE BOARD IS SUCKED IN AND BLOWN OUT OF THE ADIT

We observed the movements of the board and rod from a point 100 ft. from the mouth of the tube and nearly at right angles to it, being protected by curved iron plates containing small sight holes, with heavy wood ties and logs overhead.

A whistle was blown immediately before the shot was fired, and the first action we observed was a cloud of dust blown out of the mouth of the gallery. This was caused by what might be called the concussion wave from the cannon; there was no flame in this dust cloud. Then immediately there was an air inrush, then an outrush with little dust, then another inrush, then an outrush with flames, which appeared first at the top of the mouth of the tube. The final movement was an air inrush as the photograph shows. The second air inrush was very strong, accompanied by a loud sucking or whistling noise as the air rushed into the tube.

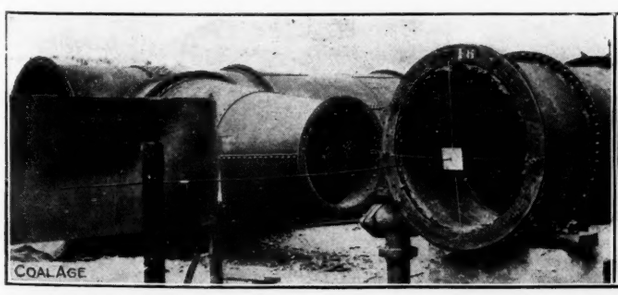
The movements were as follows:

Dust cloud.
Air inrush.
Outrush with little dust.
Strong air inrush.
Outrush with flame.
Inrush.

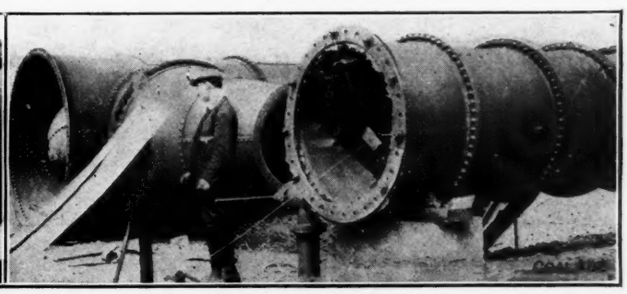
It will be noted that we were able to count two inrushes before the flame appeared, and in a longer gallery there would doubtless be many more.

No originality is claimed for this test. Doctor Wheeler could tell me exactly what would take place before the shot was fired. His pressure diagrams from violent explosions show the pulsations clearly.

It appears that during an explosion the pressures in front rise and fall in an alternating manner. The peaks of the diagrams show when the obstructing pressure is



A SMALL BOARD SUPPORTED BY SPRINGS AND A PAINTED ROD SHOWED THE MOVEMENTS OF THE AIR



AS IS CLEARLY SHOWN, THE LAST MOVEMENT WAS AN INRUSH, DRAWING BOARD AND ROD INTO TUBE

greatest and the fall is probably caused by air rushing under the advancing explosion wave to fill the partial vacuum behind. Thin sticks of "cordite" are used to indicate the position and length of flame in explosions; this ignites easily and burns slowly.

Face Shots Least Dangerous

It has been found at Eskmeals to be extremely difficult if not impossible to start a dust explosion from a shot fired from the face or closed end of the gallery, and to assure success the shots are fired 50 ft. from the closed end. It is also much easier to start a dust explosion in a small than a large area, showing that probably the most dangerous shots fired in coal mines are those in narrow crosscuts back from the face, and, of course, shots on main haulage roads which ought not to be permitted without special precautionary measures, such as heavy shale dusting for 100 ft. each side of the shot.

The flame from a blown-out shot of 1½ lb. of black powder is 14 ft. long, and 5 lb. of coal dust placed in front of the shot increases the length of the flame to 140 feet.

Where shale dusting is relied upon, it is well to have as fine dust as possible. All should pass through a lamp-gauze mesh, and 50 per cent. through a 200-mesh sieve (200 perforations to the linear inch).

Extracts from a Superintendent's Diary

Generally our young men get "trimmed" when they match wits with the City fellows, but today some of our boys reversed the order of things.

For several days a glib-tongued young man has been sojourning in our camp introducing a new form of accident policy, designed especially (so he says) for the mining fraternity.

Before being sent out on this public-spirited mission, he was coached by the general agent of his company and now he has a set speech which he rattles off at every opportunity. The general agent undoubtedly received his information about the hazards of mining from the Sunday Supplements. At any rate, this pupil assures every miner he meets that probably tomorrow or the day after he can count on being blown into at least a thousand pieces. And the inhabitants of the camp who are fortunate enough to be able to earn their living above ground are in quite as much danger because no one can foretell the moment the entire village is to be swallowed up by a mine cave.

The first miner who encountered the agent was so amused at the "spiel" that he refused to ridicule it, but instead called all of his "buddies" within hearing distance to come and get information. Naturally there were a few points that the solicitor felt rather doubtful about, and whenever he intimated that he was willing to be educated, his audience proceeded to hand out information, much of which was of a character calculated to make even the creator of the Sunday Supplement stories envious.

One thing led to another until finally a trip into the mine was suggested to enable Mr. Agent to complete his education. Some of the men assumed that the Super's sense of humor would not allow him to interfere when permission was requested to make the trip and in that they were not disappointed. In fact the Super. found himself at the manway entrance this afternoon impatiently waiting.

The Insurance Agent Takes a Trip Underground

All the way down the manway the bewildered agent's guides supplemented the impressions which he had received from his general boss by new facts, which became purposely more terrifying as the distance from the mine mouth increased, until at last, as the bottom of the slope was reached, the wretched fellow was about of a notion to turn back. This being exactly the state of mind required to make a success of the plot, the final maneuvers were not long delayed.

Just as the party turned into the first abandoned entry off the main slope, two men hiding in one of its room necks knocked out a prop under a rather large piece of drawslate and it fell with a loud boom.

Because of the fact that I had exacted a promise from the men that the fellow should not be permanently disfigured, they did not let him run far in the darkness, but he ran far enough to get bumps on all four sides of his head and one of his eyes won't behold daylight for several weeks at least.

As he was led past me at the manway entrance on his way out, he was hardly recognizable. Even his lips were unnatural, probably because of the mine water they encountered when he stumbled into one of the small pump sumps.

I rather imagine he will shift avocations when he recovers.

Uncompressed Oxygen

The difficulty in using oxygen in the compressed state is that it must be kept charged in heavy cylinders. Instead of using strong mechanical containers, chemical constraint can be substituted. Thus oxone is a substance in which oxygen is held in chemical bonds, but is releasable by the application of water. Just as water reacts with calcium carbide and forms acetylene gas and lime, so water reacts with oxone and forms oxygen and sodium hydrate.

A pound of this reagent holds 2.2 cu.ft. of gas or 60 liters of oxygen at normal pressure and temperature. Thus a pound of oxone should furnish a man enough oxygen for 30 min. of use. The oxygen evolved is said to be 99 to 100 per cent. pure, the only impurity consisting of a slight vapor caused by the energy of reaction. This is readily absorbed by passing the gas through water. The gas is then of 100 per cent. purity.

Oxone is a commercial preparation of fused sodium peroxide of specific gravity 2.43. It is hard, but not brittle, and is capable of being cast into any convenient shape, and it is said it can be stored without danger and even without deterioration if protected from moisture.

The list price of this reagent as sold by the Roessler & Hasslacher Chemical Co., 100 William St., New York, is 45c. per lb. in 10-lb. tins.

There are two unions in Germany, one socialist, the other Christian. The latter refused to order a strike in the last two big walkouts, when all the other men refused to work. The number of men in the Christian Miners' Union has fallen from 84,384 to 63,192 in the last two years. During the recent German strikes, the militia had to be called in to protect the strike-breakers and the "Christian" union men.

Flameless Surface Combustion for Boiler Heating

By O. Dobbelstein*

SYNOPSIS—Tests of a boiler designed for flameless combustion by Prof. Bone developed an average efficiency of 89 per cent. and an evaporation of 120 lb. of water per 10 sq.ft. of heating surface, the combustible employed being coke-oven gas. An experimental boiler for the combustion of tar oil developed an average efficiency of 82 per cent., with an evaporation of 240 lb. water per 10 sq.ft. of heating surface.

A discovery made, simultaneously, by Prof. W. Bone, of Leeds, England, and R. Schnabel, of Berlin, Germany, is that a mass of porous fire clay, or other refractory material, through which is passed a burning mixture of gas and air, the latter in slight excess of the amount necessary for complete combustion, soon becomes heated to incandescence, without the appearance of a flame.

In Fig. 1, *A* represents the refractory material and *B* the gas chamber for mixing the gas and air, in the correct proportions. This mixture is forced through a diaphragm, rendering the fireclay white hot, but with no flame on the surface. The combustion is concentrated in the interstices of the fireclay and is most intense at the exterior surface.

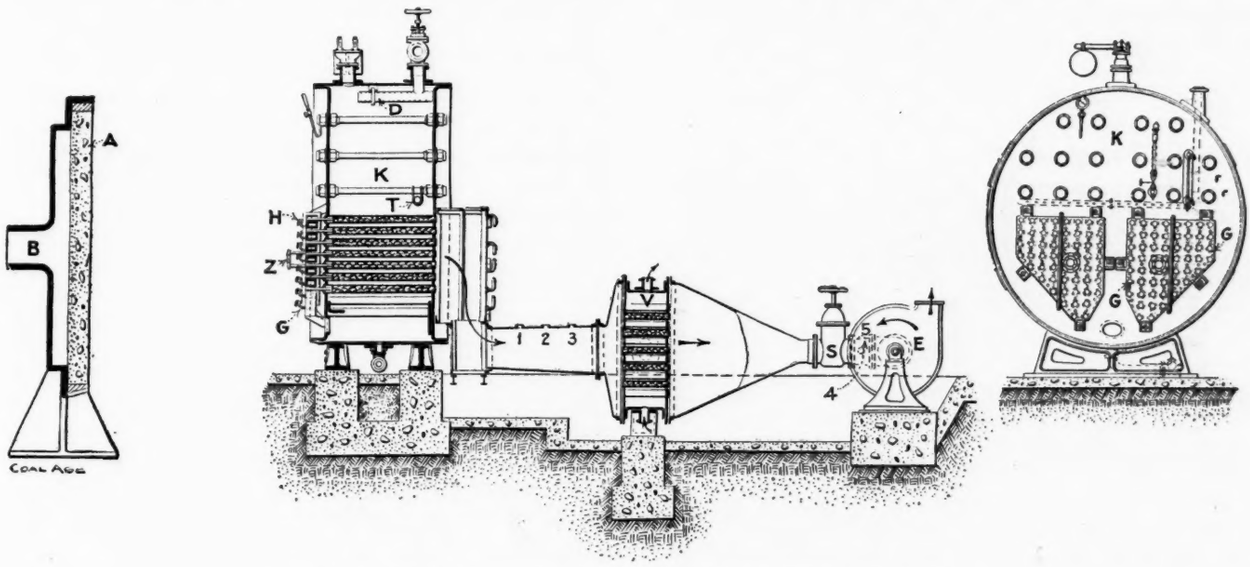
So far as the coal-mining industry is concerned, the chief interest in this discovery would seem to lie in its application to steam generation; and, with this in view, an experimental plant was constructed by the Friedrich Krupp Co., of Essen (Germany), under instructions furnished by Prof. Bone. Tests were conducted at the Hanover mine, with the assistance of the Mine Boiler Inspection Co. of Dortmund.

The boiler is shown in cross-section in Fig. 2, Fig. 3 being a front elevation. The design was that of a drum, 120 in. in diameter by 49 in. long, in which are 110 three-in. diam. tubes. In the front end of each tube is a plug of fireclay pierced by a ½-in. hole beyond which the tube is filled with refractory material.

The burnt gas, after leaving the boiler, goes through a feed-water heater provided with 103 tubes, which, also, are filled with refractory material. From the heater, the gas is drawn through an exhaust fan.

In operation, a mixture of gas and air is drawn through the boiler tubes, air being added until the flame disappears in the mass of fireclay and the latter becomes white hot. The plug protects the end of the tube, as the temperature reaches 1600° C. (2900° F.) just beyond it.

The temperature in the tube is very uneven, 70 per cent of the evaporation taking place in the first third of its length, 22 per cent. in the next third and 8 per cent., only, in the remainder. The circulation is consequently brisk. The exhaust gas leaves the boiler at a temperature of 330° to 350° F. and the feed-water heater at 200° to 230° F.



Figs. 1, 2 and 3. Details of the First Experimental Boiler

During test, the boiler was heated by the gases from the coke ovens, which had already passed through the apparatus for extracting ammonia, tar and benzol, but had not been freed from either sulphuretted hydrogen or cyanogen.

The Refractory Material Crumbled

After being in operation about three weeks, it appeared that the fire-resisting material in the tubes had crumbled or turned to cinders due to the high temperature. Moreover, the duty had fallen off perceptibly from the original amount of 120 lb. per 10 sq.ft. of heating surface at 115 lb. pressure because the granular mass in the tubes of the water heater had become sticky from leaking water and

*Essen, Westphalia.
Note—Translated and abstracted from Glückauf, of Apr. 4, 1914, by Henry B. Binsse.

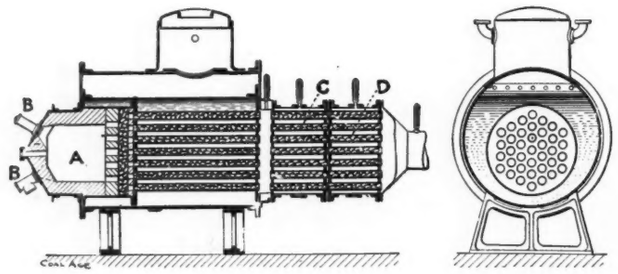
sulphur compounds, so that the exhaust fan was no longer able to draw gas enough through the steam-heating tubes.

The refractory material was renewed in both the boiler and heater and, again, the boiler worked for several days at the original efficiency. The English engineer representing Prof. Bone was dissatisfied with the tests, in which the efficiency ranged from 87 to 91 per cent., the refractory material being poor and the gas cocks too small.

Although this performance, especially the evaporation per square foot of heating surface, showed a great falling away from the published claims, still it marked a distinct step in advance in comparison with other steam-generating methods, if the process could be relied upon for steady working. Unfortunately, this had not been possible, so far. After a few weeks the tubes in the heater again became stopped up and the run was discontinued.

Another Set of Tests Were Made

In February, 1914, the trial was renewed, after an external examination of both the boiler and the heater. It was found that there was a slight scale formation upon the front end of the tubes which increased to a thickness of ⅛ in. on the rear end. The boiler had been under steam for about three months, in all. The copper



Figs. 4 and 5. Cross-Section and End View of Second Boiler

tubes of the heater were so corroded that they had to be replaced.

At the second trial, the tubes were filled with a coarser-grained material. The results of this run demonstrated that a higher evaporation duty than 125 lb. per 10 sq.ft. of heating surface at 115 lb. pressure could not be obtained from the coke gas used and from tubes of small diameter. The boiler efficiency was 88.3 per cent.

The February trial further demonstrated that the refractory material employed was not able to meet the exactions demanded and that the boiler construction employing small-diameter tubes is not the most advantageous. It is proposed to make further experiments with an improved design of boiler.

Surface Combustion with Oil Fuel

Another trial was made by the Friedrich Krupp Co. of a boiler furnished by the Berlin-Anhalt Machine Co. for the consumption of tar oil. The construction is clearly shown in the cross-sections, Fig. 4 and Fig. 5. The dimensions are 51 in. in diameter by 67 in. long, with 37 three-in. tubes, while the total heating surface is 130 sq.ft. Two feedwater heaters, *C* and *D*, are attached directly to the rear end of the boiler.

The oil, heated to 200° F., flows into the combustion chamber *A*, through the oil burners *B*, being vaporized by a blower.

Three tests were conducted by Mr. Dobbelstein, and the engineer of the Dortmund Boiler Inspection Co. At the second test, a duty of 240 lb. steam per 10 sq.ft. of heating surface was obtained, at a steam pressure of 147 lb.

The test was abandoned after a run of 7 hr. on account of the destruction of the lining of the combustion chamber. At the third trial, on Jan. 9, the duty rose to 243 lb. of water per 10 sq.ft. of heating surface, at the same steam pressure as before. In all three tests the efficiency of the plant averaged 82 per cent.

These experiments have proved that with surface combustion of tar oil, a duty of about 24 lb. evaporation per square foot of heating surface can be obtained, although it may be questioned whether this design of boiler can long withstand being driven to this extent. The Berlin-Anhalt Machine Co. has under construction an improved design of boiler with which further tests will be made and which, it may be expected, will overcome the practical difficulties encountered with the first boiler.

An Increase of Coal in Iowa

The production of coal in Iowa in 1913, according to E. W. Parker, of the U. S. Geological Survey, was 7,490,641 short tons, valued at $13,431,061. This was an increase over 1912 of 201,112 tons in quantity, and $278,973 in value.

Operators complain of the unsatisfactory character of the mine labor of the state, not so much on account of inefficiency as of exacting demands, which they claim have increased the cost of production beyond the price which may be realized for the product. This has discouraged the opening and development of new properties.

Iowa is primarily an agricultural commonwealth, and the markets for its coal, outside of what is taken by the railroads, are chiefly in rural communities and cities of moderate size, dependent upon agricultural trade. There are no extensive manufacturing interests requiring large supplies of fuel for the generation of power.

Some coal is shipped from Iowa to Nebraska, Minnesota and other states, but an equal amount is imported from Illinois and Eastern fields. The coal beds of Iowa are thin, the thickest in the Des Moines district averaging about 5 ft. They are also somewhat irregular and faulty. The coal is of a noncoking bituminous grade somewhat high in sulphur, but making a fair steaming fuel.

The number of men employed in the mines decreased from 16,370 in 1912 to 15,679 in 1913. Consequently there was an increase in the average yearly production per man from 445 tons to 478 tons.

Iowa is no exception to the other states in the interior where shooting of coal from the solid is practiced to a reprehensible degree, and the record in that respect for 1913 was worse than in 1912. The quantity of coal shot off the solid in 1913 was 5,405,142 short tons, or 72 per cent. of the total production.

There were 26 fatal accidents in the coal mines during the year, an increase of 7 over 1912. All the fatalities occurred underground, and 18 were due to falls of roof.

The Labor Situation

SYNOPSIS—No important developments during the week in any of the states except Kansas and Missouri. A bill is introduced into the federal House of Representatives to prevent the transportation of strike-breakers from state to state. The Montana Workmen's Compensation Bill is arousing some opposition.

The labor situation in the coal fields of Ohio changed but little during the past week. A large majority of the mines in the Hocking Valley and Jackson fields are in operation and others are being placed in shape for work. It is believed that practically the full capacity of the mines in those districts will soon be reached. In the Crooksville district some coal is being produced and other mines are being put in condition for operation.

The working conditions in the Massillon field are practically settled, and all but two mines are being operated. The Massillon Coal Mining Co., of Massillon, Ohio, has signed the scale and will start operations at Navarre, Stanwood and Dalton. This company has also three new mines which it is announced will be opened in the near future. Fifteen hundred men are involved in this settlement. In the Tuscarawas field, the working conditions were finally settled in a compromise and these mines will soon be active. The Cambridge district is working and a considerable tonnage is being produced in that field.

THE POMEROY BEND FIELD STILL NOT WHOLLY SETTLED

Over half the Pomeroy field is still idle. W. W. Miller, of the Pittsburgh Mining Co., writes us as follows: "The only mines which have reached a settlement are those which produce whole-vein coal, mining the clean coal, top coal and horn coal. The oldest shippers in the district mine their coal under the horn, and these mines are still without a settlement, as the miners are demanding a differential of 4c. per ton above the mine-run rate as agreed upon in the state agreement at Columbus."

EASTERN OHIO STILL IDLE

So far no efforts have been made in eastern Ohio to bring about another conference of the scale committee of the operators and miners. A report was current that the miners were about to take a referendum vote on the proposition of accepting or rejecting the offer of the operators for 99c. for lump and 2c. for slack, or the 41.12c. scale. But this is denied by those who are in a position to know.

It is stated that President C. J. Albasin, of subdistrict No. 5 of the United Mine Workers of America, will go to Indianapolis, Ind., and make an appeal to the International Executive Board of the Union, asking that all the mines in Pennsylvania and West Virginia now operated by mine owners who have mines in Ohio where strikes are in force be closed by the union. Such an action in districts having contracts with the organization would be in violation of the agreements signed; in others it would be beyond the power of the union; so it is hardly likely that the petition will be heeded at the union headquarters.

A READING DISPUTE

The general grievance boards of all the Philadelphia & Reading Coal & Iron Co.'s collieries in the Northumberland County district, employing about 5000 men and boys, notified the officials of the United Mine Workers of America to order all the Reading men in the district to go on strike on the 17th unless the grievances at the Alaska colliery were settled by Saturday, the 15th. The employees at the colliery in question had refused to report as required at a certain point morning and evening. Such a strike would be a violation of the agreement. All disputes must be settled by the Conciliation Board without a strike of the miners. We are glad to hear that the men finally decided to keep their bargain and remain at work though the Alaska mine is idle in violation of the agreement.

CENTRAL PENNSYLVANIA

The central Pennsylvania district, No. 2, is peculiar in that it has no subdistricts. In 1900, nine subdistricts were created, but in 1906, by a vote of delegates in a convention in Du Bois, Penn., these were abolished. There is a strong sentiment against this abolition and recently an unofficial convention of protest was held at Altoona and the delegates, protesting that the action in 1906 was ultra vires, desire the International Executive Board to declare the result of that vote null and void.

The Miller Coal Co., of Portage, Penn., has sued the local union at that place, No. 570, for $5000 damages. It is alleged that when the company refused to accept a certain checkweighman elected by the men, the Union spread defamatory and damaging reports in circulars and letters, and the company lost much business as a result.

WEST VIRGINIA

It was expected that the men of the Four States Coal Co., at Dorothy, W. Va., would go on strike on Saturday, the 15th, but they did not. Approximately, 500 men are employed. The rate paid is 26c. for machine coal and 31c. for pick coal. The miners want 32½c. for machine-room coal, 37c. for machine-entry coal, and 56½c. for pick-mined coal, which are the Kanawha scale prices for work in the Coalburg seam. The Four States Coal Co. is not a member of the Kanawha Coal Operators' Association, and the union is making every endeavor to bring its scale up to that of mines nearby.

Twelve hundred men employed by the Boomer Coal Co. went on strike following the discharge of Fletcher Norman, a colored machine man. The company alleged that Norman had broken the rules and dispensed with his services. The case is taking the regular course prescribed by the agreement, and the strike is therefore in plain violation of the union rules.

At Marting, W. Va., near the Kanawha and Michigan station, F. Littleton, of Charleston, and R. L. Sprouse, of Glasgow, were assaulted by strikers with pick handles. The men were employed by the Columbia Iron & Steel Co., and had refused to join the union. After the men had been beaten up, the strikers went back to work.

THE SOUTHWESTERN AGREEMENT

On Aug. 15, an agreement was reached between the miners and operators in the state of Kansas and in Vernon and Bates Counties, in Missouri. Other joint committees of the operators in Missouri, Arkansas and Oklahoma, also in session, did not succeed in making agreements.

A bill has been presented by John W. Evans, of Montana, to the House of Representatives which will stop the passage of strike-breakers from state to state. Senator Martine has presented a similar bill to the Senate. The measure puts the burden of holding strike breakers in their respective states on the railroads and steamships. A citizen getting or buying a ticket will be subject to inquiry from the ticket seller as to whether he is a strike-breaker. The law does not require that the railroad shall knowingly offend in order to come under its provisions. Note that it says merely that "it shall be unlawful . . . to carry or transport . . . strike-breakers." This bill, we are told, follows a brief submitted to Congress by E. P. Costigan, Horace N. Hawkins and James H. Brewster, attorneys for the United Mine Workers, and further, it is in accord with the views of the present administration, which is also probable, seeing its origin.

BILL PROHIBITING IMPORTATION OF STRIKE-BREAKERS

The bill reads as follows: "A bill to prevent the transportation by interstate carriers of certain persons and articles for the alleged prevention of so called labor troubles.

"Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, that from and after the passage of this act, it shall be unlawful for any railroad, railway, steamship company, person or association or any other common carrier engaged in interstate business to carry or transport into any state or territory any men hired, employed or engaged as strike-breakers, so called, for the purpose of assisting in or interfering with any labor trouble or strike.

"Sect. 2. That it shall also be unlawful for any railway, railroad, steamship or other company, person or association engaged in interstate business to transport, handle or carry any firearms or ammunition into any state or territory for the purpose of assisting in arming or equipping such so called strike-breakers.

"Sect. 3. That a violation of this act by any railroad, railway, steamship or other company, person or association engaged in interstate business as a common carrier shall be punished by a fine not exceeding $1000 and imprisonment not exceeding one year, said fine and imprisonment to be imposed on the president, manager or other officer, agent or employee of the said interstate carrier who may be found guilty of a violation hereof.

"Sect. 4. That this act shall not apply to the organized militia of any state or territory, the officers or men of the United States army, or to any duly organized and uniformed police force or constabulary having jurisdiction of the territory embraced within such labor trouble or strike."

MONTANA COMPENSATION BILL

In Montana, the employers have formed an organization to oppose the passage of a workmen's compensation act. Just what form this opposition will take is not clear, but let us hope that the objection is not to all forms of compulsory compensation, but to certain specific provisions in the bill. Oscar Rohn, of Butte; W. B. Rodgers, of Anaconda, and J. E. Woodard, of Roundup, together form the "Committee on Metal and Coal Mining and Ores."

It is alleged by H. G. Miller, of Kalispell, that wages are already 25 per cent. higher in Montana than in Washington. Hence the compensation based on the same percentage would also be higher. It is also stated the rates of assessment are 100 per cent. higher than in Washington. Of course, this is not so important, as they would be adjusted if too high, but the liabilities for total temporary disabilities are 50 per cent. higher than in Washington state, for permanent partial disabilities 70 per cent., for total permanent disabilities 50 per cent., and for fatal accidents 50 per cent.

Moreover, in the state of Washington, 40 per cent. of all cases involved time losses of not more than 12 days. In that state, if an employee were disabled for three weeks the claims would be settled for $21. In Montana, he would receive $32 of insurance, $22.50 in cash, and in addition the hospital fees for bed and board, which would make more than the employee would receive if working. In Washington, it has been necessary to amend the law and to provide that benefits could not be paid for the first two weeks. It is likely that Montana will need some such provision.

COMPENSATION OF SALARIED OFFICIALS

In West Virginia, A. W. Calloway, of the Davis Coal & Coke Co., announces that the company will insure the lives of all those in its employ who would otherwise not receive benefits under the compensation law without any expense to them. The company will pay the beneficiary one year's salary in monthly instalments on the death of such an employee, provided he has worked for the company for a whole year. If he has worked less than a year for the Davis Coal & Coke Co., payment to the beneficiary will be equal to six months' salary.

Recent Machines for Loading and Quenching Coke*

Those who are interested in the loading and quenching of coke will find in the contribution of Mr. A. Thau, M.E., to Gluckauf, for Feb. 28, and Mar. 7, a lengthy review of the development in this branch of the industry since 1911. The writer states in conclusion that most of this work is no longer of English but of German origin; and, moreover, that German firms have greatly improved upon previous English machines.

This would seem to be one of the factors in the extremely rapid growth of German coal and coke exportation, which has nearly overtaken that of Great Britain. To appreciate how important this is, we should bear in mind that these products form about one-tenth of all the exports from the United Kingdom.

Mr. Thau divides the machinery into three classes: loading machines for horizontal or inclined, elevated or depressed platforms, quenching machines, which deliver the coke to a separator without the use of a platform and combined quenching and loading systems.

Figs. 1 and 2 show the construction of an English machine, which easily handles the output of 100 ovens. It consists of an endless elevating chain, carried by a substantial iron framework, resting on three pairs of truck wheels.

DETAILS OF OPERATIONS

The coke from the inclined platform is directed onto the guide *d*, by which it is delivered to the level part of the chain, and carried up the incline *e* over a screen, beneath which is a bunker *f*. On reaching the top, the screened coke falls into the chute *g;* and passes thence into the car. The driving mechanism and platforms are clearly indicated. Fig. 3 shows the chain cross-section.

In Fig. 4 we have a German machine built for a Belgian company to load 500 tons daily. The coke falls from the inclined platform *a* into the bucket *g*. It is hoisted by block and falls to the topmost position, as shown. Here it is dumped into the chute *p*, and passes over a shaking screen *k*.

The frame is carried on double rails at *e*, and a single rail at *d*. The driving motor and mechanism are just beneath the roof. There are two other motors just below, one to shake the screen and one to move the apparatus along the track. The chute *q* catches the ashes and small coke and delivers them into a bunker or a car.

A COMBINED QUENCHING AND LOADING MACHINE

The third example, Fig. 5, is a combined quenching and loading machine, built by the Berlin-Anhalt Machine Co., Ltd. The coke is delivered into the tubs *b*,

*Abstracted from the German by H. B. Binsse, Short Hills, N. J.

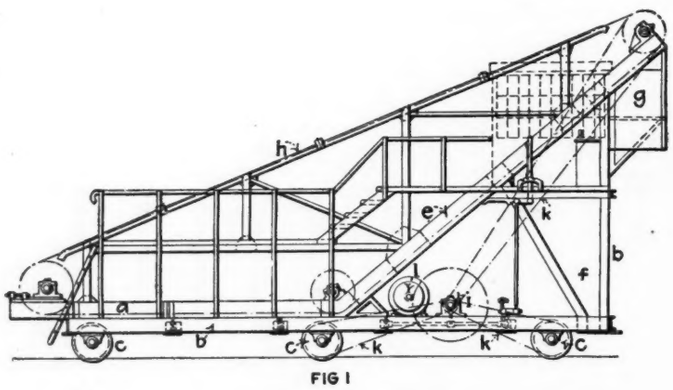


FIG 1

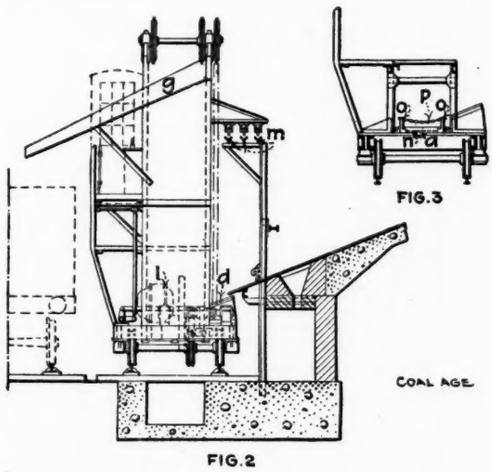


FIG.2

FIG.3

FIGS. 1, 2 AND 3. SIDE VIEW AND CROSS-SECTIONS OF AN ENGLISH COKE-LOADING MACHINE

under which is a water tank *a*, into which the tub sinks from the added weight of the coke, thus cooling the walls of the tub and finally opening a valve in the bottom. The water now enters, and turns into steam, which not too rapidly cools or quenches the contents.

This makes the best appearing and hardest coke. The tub is then elevated to the upper position, as shown, the water draining back into the tank through a sieve. The coke is unloaded from the tub into the bunker *i*, from which it is discharged onto the endless chain k, which acts also as a screen, allowing the finer pieces to fall through and to be dumped into the car *n*. The good coke is carried along by the chain and falls into the other car. One man operates the entire machine.

Mr. Thau's paper describes a suprising variety of machines designed for this purpose, showing the great attention Germany is now paying to labor-saving appliances.

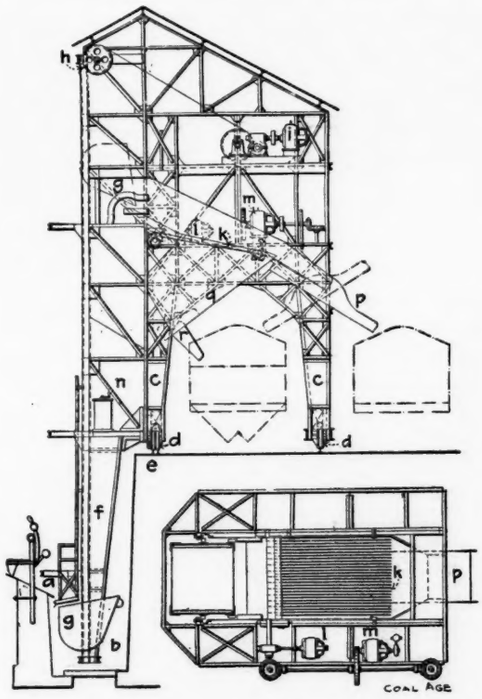


FIG. 4. A COKE-ELEVATING AND SCREENING MACHINE

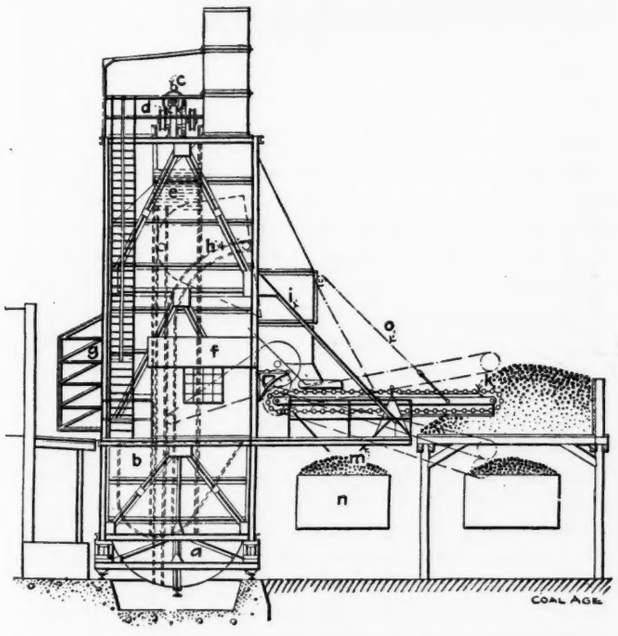


FIG. 5. A COKE-QUENCHING, ELEVATING, SCREENING AND LOADING MACHINE

Oklahoma Breaks Her Coal Record

During the year 1913, coal was mined in Oklahoma to the amount of 4,165,770 short tons, valued at $8,542,748, according to figures compiled by E. W. Parker, of the U. S. Geological Survey, in coöperation with the Geological Survey of Oklahoma.

Oklahoma more than any other of the coal-producing states in the Mississippi Valley and the Rocky Mountain region, was benefited by the labor troubles in Colorado, as is shown by the increase in production over 1912, amounting to 490,352 tons, or 13.34 per cent. The value of the product increased $675,417, or 8.6 per cent. The smaller relative gain in value in 1913 was due to the fact that in that year prices were somewhat inflated because of the rather abrupt withdrawal of fuel oil from the market, where it had been in competition with Oklahoma coal, and to a diminution in the supply of natural gas from the northern part of the mid-continent field, particularly in Kansas.

The deficiency in the Kansas production of natural gas is being made up, however, by development in Oklahoma, and the result as well as the fact that the supply of coal is catching up with the demand on account of the increased production of 1913, is exhibited in the return to lower prices, the average value per ton in 1913 being the same as in 1911. The total number of men on strike in Oklahoma in 1913 was 1696; the average time lost by each man being 80 days.

Oklahoma continues to show a high percentage of coal shot off the solid, a practice encouraged by the laws which compel the payment of wages on the basis of mine-run coal.

The number of days the men were able to work in 1913 shows a marked improvement over the two preceding years, and if no time had been lost by strikes, the average number of days worked would have exceeded 200 by a considerable margin. As it was the average time made by the 9044 men employed was 197 days, compared with 8785 men for 174 days in 1912. The average total production for a man in 1913, was 461 tons.

The fatality record of Oklahoma in 1913, according to the Bureau of Mines, shows a decided improvement over 1912, when, owing to an explosion of gas and dust in the San Bois mine, at McCutcheon, the death roll was high. In that one explosion the lives lost amounted to more than three times the total number of deaths in 1913, when 23 fatal accidents occurred.

Experience has shown that it is not wise to use one cylinder of a Draeger apparatus for the outward trip while holding the other in reserve for the return. It is safer to depend wholly upon the pressure gage and use only one valve, as the wearer may run over time with one cylinder and be overcome by lack of oxygen, without the preliminary warning of dizziness, and fall unconscious while he still has a full cylinder.

A Large Steam-Pump Installation

SYNOPSIS—Two compound steam pumps, weighing 75 tons each, are being installed in an underground pump room of an anthracite colliery. Each pump normally handles 3000 gal. per minute against a 600-ft. vertical head.

In the operation of mine pumps, efficiency is desirable but reliability is necessary. In many cases the operation of the pumps is of secondary importance only to that of the fan, for should the former cease running the pit would soon be flooded. For this reason, in order to be successful, such machines must not only be of sufficient size and capacity to handle the amount of water made by the workings, but must be so constructed as to render repairs and replacements both quick and easy, securing meanwhile as great efficiency as is consistent with reason.

In the Packer No. 4 Colliery of the Lehigh Valley Coal Co., at Lost Creek, near Shenandoah, Penn., there are being installed two Goyne, compound, duplex, steam, plunger pumps of a normal capacity of 3000 gal. per minute each against a vertical head of 600 ft. The high- and low-pressure cylinders of these machines are 25 in. and 44 in. in diameter, respectively, the diameter of the plungers is 15 in. and the stroke is 4 ft. The suctions are double, that is, composed of two 14-in. pipes, one upon either side. The discharge pipe is single, 15 in. in diameter. The steam and exhaust pipes are 7 in. and 10 in. in diameter, respectively.

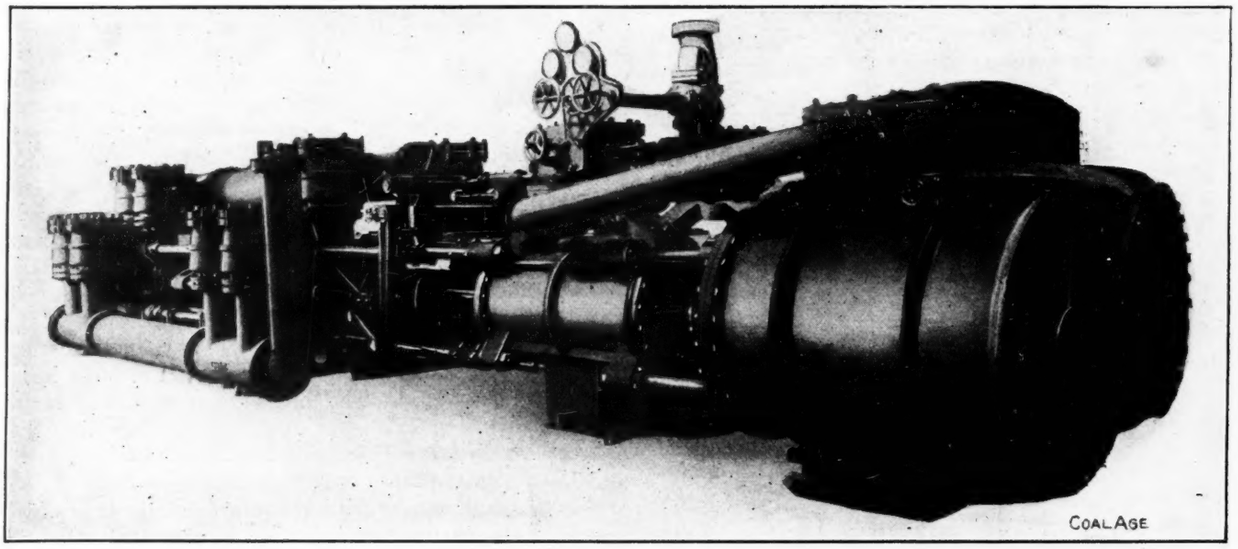
These pumps, which are 41 ft. 5 in. long over all and weigh 75 tons each, are being placed in a pump room cut out of the solid rock and provided with a traveling crane. The high-pressure cylinders are equipped with Goyne patented adjustable cut-off valves, which may be adjusted while the pump is in operation.

This cut-off device consists of two elements. The primary valve works upon a seat in the ordinary manner with a travel parallel to that of the pistons. The secondary valve is double, rides upon and is carried forward and backward with the primary valve, but has, meanwhile, a transverse travel across it.

The function of this secondary or cut-off valve is exactly analogous to that of the well known Meyer riding valve. Since in a pump the piston movement is not uniform in length, a rider with a travel in the same direction as that of the primary valve, upon which it seats, would not be applicable. This difficulty is, however, entirely overcome by causing the two valves to move at right angles to each other.

A compound pump provided with this cutoff has, on test, shown a saving of 8 per cent. on an indicated horsepower basis. On simple pumps the saving is, of course, greater.

Positive lubrication of cylinders is secured by power-driven oil pumps, and each machine is provided with steam, vacuum and water-pressure gages, as well as a stroke counter. The steam cylinders are not bolted fast in position, but the stand feet are free to move in machined guides, thus making provision for expansion and contraction.



A PHOTOGRAPH SHOWING THE STEAM END PARTICULARLY

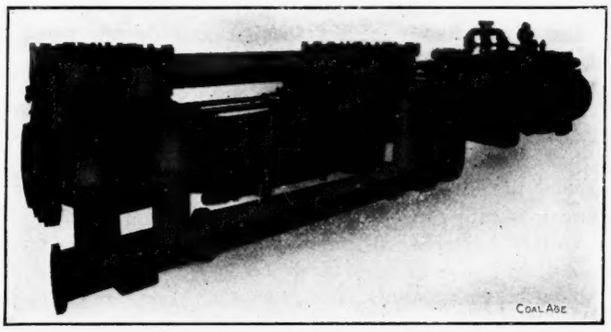
Cross exhaust is made between high- and low-pressure cylinders, the latter being provided with balanced valves. A live-steam connection is also made to the low-pressure cylinders, which permits operation of the pumps at full capacity should the steam pressure, which is normally carried at about 100 lb. at the boilers, fall appreciably. Final exhaust is made to a 12x18x18-in. Goyne, single, special jet condenser.

The water end of the pump is lined throughout with wood, bronze and composition. It is fitted with 16 valve chambers, each provided with a Goyne, hood-type, leather valve operating on a bronze seat. The plungers are outside connected center packed.

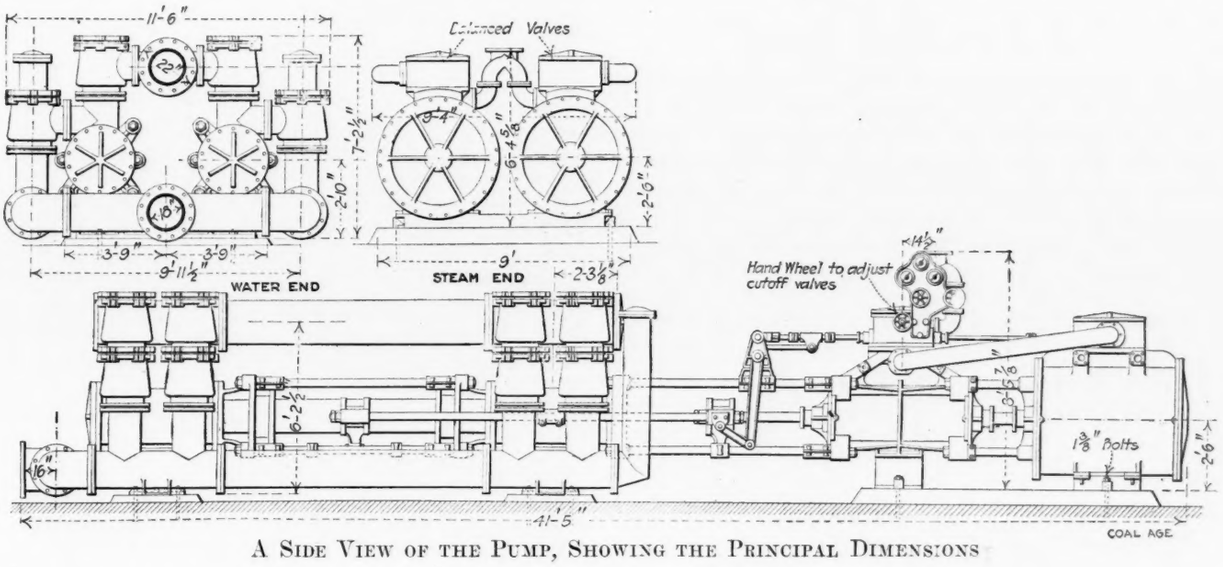
As may be seen in the accompanying drawing, each plunger is provided with a crosshead fitted with an ad-

justable wearing shoe working on a guide. The plunger's weight is, therefore, taken by the guide and not upon the packing in the stuffing-boxes.

The working barrels are connected by heavy steel tie-rods fitted with removable clamp collars to facilitate repairs or the renewal of parts. The same construction is followed in joining the steam cylinders to each other, and to the water end of the machine. This renders it possible to make many repairs quickly and with extreme



PHOTOGRAPH SHOWING THE WATER END OF THE PUMP



A SIDE VIEW OF THE PUMP, SHOWING THE PRINCIPAL DIMENSIONS

ease. For instance, the packing rings upon any piston may be renewed without removing the piston from the rod or entirely from the cylinder in which it works.

While, as stated in the beginning, a mine pump must primarily be reliable, economy is nevertheless important. Mine pumps are usually operated continuously day and night, so that even a slight lessening of the steam consumption per horsepower-hour amounts to a considerable quantity at the end of the mouth. While in the nature of things the saving secured through the use of the riding cutoff valve above described, is not as great in a compound as in a simple pump, yet this saving is like interest on money—it keeps on working day and night, Sundays and holidays, throughout the entire life of the installation.

The requirements as to the reversal of the air current are being met at some mines in England by the construction of additional fan drifts, and the erection of doors to be opened or closed as the case requires.

A Promising Thermopile

SPECIAL CORRESPONDENCE

An invention on which a German engineer, Johannes Marschall, of Dresden, has been working for some years past, holds out the prospect that domestic electric light may some day be obtained without the intervention of a central power station, by means of an apparatus which will merely require to be supplied with coal like an ordinary stove.

The fact that electricity is generated when the junctions of different metals are kept at different temperatures was noticed by Seebeck nearly a century ago, and many efforts have since been made to utilize the phenomenon on a practical scale, the thermopiles of Clamond and Hauck being examples. But various technical and manufacturing difficulties have been encountered. The current obtained being at best very weak, large numbers of elements must be combined in order to yield any serviceable effect, and alloys which gave a reasonably high electromotive force had the objection that their electrical resistance was also high.

The forming of the junctions between the metals or alloys presented another set of troubles. In some cases the parts were screwed together, but with that method of construction oxidation was apt to occur and cause an undue increase in the resistance. Soldering, and especially hard soldering, is possible only with certain metals and over small surfaces. And even where this method is employed, the junctions prove unable to resist a high temperature for any considerable period of time. Welding, again, is impracticable with many metals.

In the Marschall apparatus, an attempt has been made to overcome these difficulties. The positive electrodes are made of a special alloy, which yields a high electromotive force but has a low specific electric resistance. The negative electrodes are composed of a copper-nickel alloy, while the junctions between the two are ingeniously effected by means of electro-deposited copper.

Five of the elements thus constructed are arranged together in series to form a "section," and a number of these sections are bound together in a ring, the junc-

tions which are to be heated being all at the bottom of the sections and those which are cooled at the top. As many of these rings as may be needed to give the required output are slipped over a central heating tube and clasped firmly upon it.

The furnace is designed as a gas generator, the fuel being gasified and conveyed to the heating tube, where it is burnt with the aid of a suitable air supply from without. Outside the rings there is a casing through which cool air circulates round the cold junctions of the thermopile, the object being to maintain as great a difference of temperature as possible between the cold and the hot junctions, which latter rest on the central heating tube.

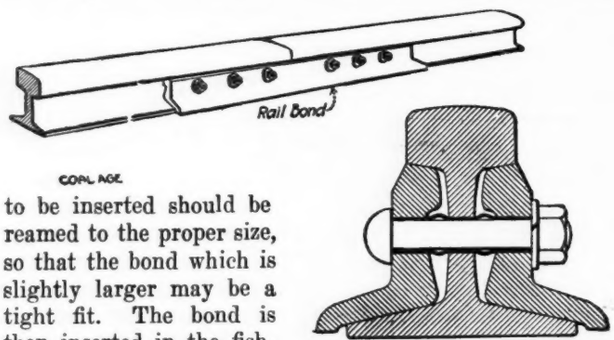
An experimental pile containing 10 elements has been tested in this country (England), and with a temperature difference of about 300 deg. C. (540 deg. F.) between the hot and cold junctions the electromotive force was found to be 0.03 volt per element. It is estimated that a plant 3 ft. in diameter and 7 ft. long, containing 1000 elements, could be constructed to give 1½ kw. at 35 volts. A plant with a capacity of about 1 kw. has been in operation for some time past in Dresden, and it is stated that so far no change has been noticed in the resistance of the hot junctions.

A New Rail Bond

The Jamison rail bond is nothing more than a bushing made of soft copper, the outside of which is slightly larger in diameter than the reamed hole in which it is to be placed. This bond is designed to be inserted in the same holes as the bolts which fasten the regulation fishplates to the rails. One or more bonds are placed on each side of the rail joint, depending on the size of the rails and the strength of the current which is to be transmitted.

Bolthole Bushings Instead of Copper Ribbons or Wires

When the rails are in place, the fishplates should be secured by at least one bolt in each rail to bring them into register, then the other holes in which the bond is to be inserted should be reamed to the proper size, so that the bond which is slightly larger may be a tight fit. The bond is then inserted in the fishplate, pressed through the rail and then through the opposing fishplate. In pressing the bond into its proper position, the holes in the rail and fishplates are coated with copper, giving a copper to copper connection.



A Bushing Rail Bond Using Fishplate as Conductor

Then a hardened-steel expanding mandrel is introduced which from the interior of the bond forces the copper into intimate contact with every particle of the surrounding steel of the rail and fishplates. Thus the bond is given a perfect contact with both the rail and the fishplates as the current can pass from rail to rail through the fishplates and bonds. The final step is to insert and tighten up the bolts.

This bond can be used for busbars on switchboards and for electric bridges but its largest use is for bonding the rails of electric railroads for the transmission of the return current. The method is alleged by the manufacturers to save 80 per cent. of the cost for material and labor in the providing of ordinary rail bonds. The fact that it is almost impossible to steal these bonds is a large item in their favor. As they are not visible when in use, they do not even tempt people to steal them.

A Durable Bond

It is stated, however, that the bond can be removed with ease by the use of a simple patented tool. As the bond fits air-tight into holes in the rail and fishplates, no moisture can enter to cause the bond to rust at the contact. Such a rusting would cause an imperfect contact, and the arcing which resulted would hasten the deteriorating action. But with such a close contact the primary steps leading to a loose and burned connection cannot occur.

The ordinary bond has two connections between copper and steel; this has four for each bond but as an offset there are connections to two fishplates and the chances of inefficient bonding are halved by that fact. Operators will be interested to note in what degree this bond is applicable to mine work.

Bond Not Sheared When Temperature Changes

The company publishes several testimonials showing that the bond has given satisfaction to street-car companies so it is evident that the expansion of the rail does not shear the bonds. This is probably due to the fact that the fishplate and rail are separated at the bolt hole and there is room for the bending of the bond between the moving surfaces.

Experiments by Wilbur A. Carrell & Co. showed that two of the bonds did not give an appreciable resistance and one with only two copper bushings gave one quarter the resistance of an equal number of ribbon bonds of the usual type. The manufacturers state that bonds placed April, 1910, in the Mifflin-Homestead line are in as good condition today as they were when placed in the rail.

The bond is made by the Jamison Rail Bond and Electrical Supply Co., 202-203 Keystone Bank Building, Fourth Ave., Pittsburgh, Penn.

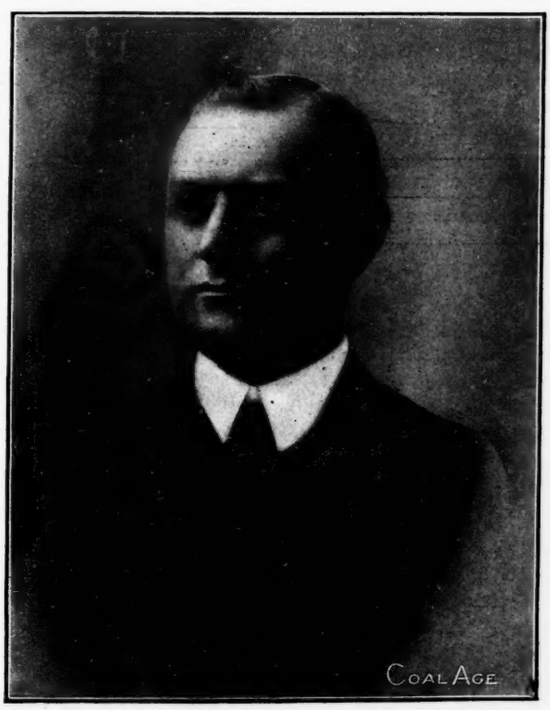
Application of Fellow-Servant Rule—Employment of Minors—Amount Recoverable for Personal Injury—The rule which exempts a mine operator from liability for injuries to an employee resulting from negligence of a fellow employee does not apply to employees in charge of separate trains of mine cars. When a boy under 16 years of age is employed in a mine without his father's consent, the boy will be permitted to recover damages for injuries received by him in the course of his employment without regard to whether the employer has been guilty of negligence in the occurrence of the accident, if the employer knew that the boy was under age. Two thousand dollars is not excessive recovery for injury to such an employee, where his ankle and foot were crushed, he was confined to bed for more than a month, and was compelled to walk on crutches for several weeks after his confinement ceased. (Kentucky Court of Appeals, Stearns Coal & Lumber Co. vs. Tuggle, 161 Southwestern Reporter 1112.)

Who's Who in Coal Mining

Samuel Dean

Starting as an apprentice with a mining engineer and colliery manager in Lancashire, England, Samuel Dean has worked his way to a position of respect in the coal industry of that turbulent state, Colorado.

After serving his apprenticeship, Mr. Dean was employed at the Rainford Colliery in Lancashire, doing various kinds of work underground. Following this employment, he had charge of mines in the County of Durham and was particularly successful in sinking a mine shaft through running sand at one of the collieries where he was employed. Following this accomplishment, he had several other experiences in shaft sinking through



SAMUEL DEAN

heavily watered strata and is today somewhat of an authority on this subject.

Mr. Dean left England in 1907, coming to this country and a little later organizing the Gallup Southwestern Coal Co., Gallup, N. M. He was the first manager of this company, Harry Lauder, the Scotch comedian being one of the stockholders. Mr. Dean joined the engineering staff of the Victor-American Fuel Co., in 1910, and probably was the first person to introduce stone-dust treatment in American mines. He is a member of the North of England Mining & Mechanical Engineers and the Rocky Mountain Coal-Mining Institute. He holds a first-class manager's certificate issued at Manchester, England, in 1903. He is also the holder of Colorado mine foreman and fireboss certificates, and has been captain of the Delagua first-aid team for the last three years.

Mr. Dean was recently elected to the "Daglish Traveling Fellowship" by the University of Durham, England, and in accordance with the stipulations of this fellowship, he is now concluding an extended trip of investigation through European mines. His observations throughout his European travels are now being published in COAL AGE each week.

Mr. Dean writes from Montreal, Can., that he succeeded in leaving France after war broke out, reaching that city, Aug. 15, by the mail steamer "Tunisian." Fortunately he explored the German mines first and was visiting France when hostilities commenced.

Device for Detecting Firedamp

BY LEONARD KEENE HIRSHBERG*

The difficulty of utilizing the well known property of platinum black for the detection of the presence of firedamp in coal mines, would appear to have been satisfactorily overcome in a recent invention of Alfred Williams. The rapid absorption of gas by platinum black causes a rise in temperature in the presence of even a small percentage of methane or firedamp. The circumstances, however, which have thus far prevented its useful application to the detection of gas in mines are: First, the difficulty of devising a reliable and easily understood means of indicating the percentage of firedamp present from the rise in temperature caused by the absorption of the gas; and, second, the fact that small percentages of firedamp do not sufficiently affect the platinum black when the initial temperature is low. The first difficulty has been overcome by a thermo-electrical method, and the second by a preliminary heating of the platinum black.

The instrument is so arranged that the air of the mine passes through a tube containing a pair of differential thermo-electric junctions, in series with each other and with a galvanometer, which may be fixed remotely from the thermo-couples. As long as the junctions remain at the same temperature, whatever that may be, their actions balance one another and the galvanometer indicates zero. Surrounding each junction, however, is a small head or capsule of a porous material. One of these heads is impregnated with platinum black, which raises the temperature of that junction when firedamp is present and causes a corresponding deflection of the needle of the galvanometer. Around or through each head is a minute loop of platinum wire carrying sufficient current from a small battery (the circuit being independent of the thermopile circuit), to raise the temperature to that at which platinum black is most sensitive. The galvanometer scale may be graduated in milli-volts; but preferably it should be graduated so as to read directly the percentage of firedamp present.

Tests of this instrument, made by Prof. Silvanus Thompson, have given satisfactory results, but indicate the necessity of keeping the auxiliary heating current at a constant value. One of the greatest benefits of a reliable method of testing for firedamp, independently of the miner's lamp, is that it permits of the exclusive use of electric lamps and thus displaces the ordinary Davy lamp, for the purpose of testing for gas.

Coke breeze which often lies in piles near beehive coking plants can be profitably utilized. The larger sizes can be prepared for foundry purposes, while the next larger size makes the best kind of fuel for hot-air furnaces in residences. The very fine material can be sold to zinc-retort operators.

*Johns Hopkins University, Baltimore, Md.

Editorials

The officers of great corporations are coming to realize that big business cannot be private. The management of any great industrial or mining enterprise is a form of government. It governs the lines of all its employees and many of its patrons far more intimately than the Administration and Congress of these United States govern them. Such a system generally exists through force or inheritance, which is wholly undemocratic because its rulers are not chosen by the votes of the people governed. That is why the so called common people are opposed to the old method of conducting business on monarchial lines where the keynote of all activity is secrecy.

The distinctive aim of the I. W. W. is to bring about the coöperative ownership of the tools of production. Just why it is necessary to use violence and break laws to realize this dream is more than we can understand. The employees of any great industrial corporation in America could obtain the complete ownership of the company they serve within four or five years' time if they so desired. There is no longer prejudice against ownership of stock by employees. The only difficulty in the way is the preference of the workers to get 3 or 4 per cent. without any risk of loss, than to assume the chances incident to industrial ownership. Workingmen in New York City alone have more than a billion dollars on deposit. If wage earners could be educated to know the powers and possibilities that are theirs, not only would the capitalist class disappear, but the general strike would be no more, for workingmen would then understand that wages are paid not out of capital, but out of production. It would be plain to all that the greatest crime that can be perpetrated against the wage earners is to stop production.

The War and the Coal Markets

Rumor-mongers are busy. Statements of all kinds are being circulated. Many bearing on the coal trade are without any foundation of truth. One report says a million tons of coal is to go to Russia. Other large tonnages are said to be on their way to Canada for the purpose of coaling British war vessels. Further dispatches would have us believe that the need for coal to supply Italy, Spain, Denmark, also Mediterranean countries and South American, is so urgent that the mines of the United States will have to work beyond capacity to fill the want.

The fact is, the coal business is unusually slow, and prices are unsatisfactory. The mines of this country in the present depressed state of business can supply with ease any quantity of coal the other nations may want. There is little likelihood the outside demand for American coal will equal or offset the decrease in domestic consumption, resulting from slack business this fall. It is, therefore, ridiculous to credit the current talk of fuel scarcity and price advances. Such statements do not emanate from the coal producer, but come from a few unscrupulous retailers who are endeavoring to profit by playing on the credulity of their uninformed customers.

That the conflict in Europe affords American coal-mine owners an opportunity to introduce their coals into foreign markets is true. If ships can be secured with freight charges reasonable, a few eastern fields (West Virginia and Pennsylvania especially) should secure a number of contracts for a considerable tonnage to South America and Europe. The Panama Canal is now open, and that is also a favorable condition.

As to the extent of our foreign possibilities, some idea may be gained from the following facts: Eight countries of South America purchase about $62,000,000 worth of coal annually. Of this amount the United States sold only $4,223,118 worth, while the British mine owners furnished $53,000,000 worth of coal to these eight countries. The greatest opportunities for American coal producers would seem to be in Argentine and Brazil, which countries annually import $25,000,000 and $24,000,000 worth of coal, respectively.

Our coal trade on the west coast of South America amounts to practically nothing. But now that the Panama Canal has been opened to shipping, we should secure some considerable part of the business of Chile, Peru, Ecuador and Bolivia. The first mentioned country imported $11,000,000 worth of coal last year, of which our share of business amounted to approximately $500,000.

There are also numerous opportunities at the present time for American coal on the other side of the Atlantic, and we should endeavor to avail ourselves of the present period to enter foreign markets; however, when the entire tonnage of possible exports is considered in the aggregate, the total is not a figure that holds hope of relieving to any great extent the unsatisfactory conditions in the whole fuel industry of America.

We produced last year about 575,000,000 tons of coal in this country; our mines could easily add another 100,000,000 to this output and not exert themselves very noticeably. Therefore, there is no occasion to get excited over an opportunity to send a possible 25,000,000 tons—but probably less—to foreign markets. As for any unusual increase in the price of coal to consumers, because of the European war, the idea is absurd, and it may be stated positively that mine owners have had no part in any such increase either actual or implied.

The Storage Problem

No problem is so important in mining as the discovery of a flywheel which will keep business moving steadily and normally year in and year out. Depression and excessive activity alternate, with the former occupying by far the longer periods.

However, the success of storage as a cure for this condition cannot be assured till the technique of that measure is better developed. C. A. Hall, the fuel agent of

the Chicago & Eastern Illinois R.R., at a meeting of the International Railway Fuel Association, of which he is secretary-treasurer, advocates storage of coal as a cure-all for excessive coal operation, low prices, unemployment, undue purchases of rolling stock, unequal seasonable traffic and other mining and railroad ills.

Now storage of coal would, if successful, perform all these services if coal could be stored as he suggests, but the limit of height in storage is 20 ft., and many coals under present conditions of storage will fire if the coal pile exceeds ten feet in height and may ignite spontaneously at even less depths in some cases. Mr. Hall himself sets the limit of height for coal piles of bituminous coals as normally 15 ft.

But it must be remembered that coal may heat if kept in far smaller piles and then it suffers much more deterioration than the United States Bureau of Mines and the University of Illinois have shown in their tables. Unfortunately despite the fact that the authorities mentioned have made abundantly plain that the storage must be practically without heating if the results tabulated are to be obtained, everyone who does not ignorantly question them, has taken them as being true so long as the mass does not actually fire.

It is important to remember that with one exception the results of Porter and Ovitz, of the Bureau of Mines, were obtained from small samples containing between 300 lb. and 6 tons and such small quantities could not suffer from heat storage. The one large mass of coal was stored under tropical conditions and may have wetted frequently.

In fact that oxidation is not the important cause of heating is evidenced by the fact that coal is slow to become heated, yet all the deterioration in the earlier stages is due to oxidation. Later the coal becomes dried out in the sun and when it is moistened the heat of hydration probably causes it to fire, though other causes are possible.

Perhaps by keeping coal continuously moist with a spray or by covering it with an envelope of some soapy substance like lysol, it might be prevented from complete dessication or if it should become dried it might more slowly became hydrated if it had a waterproof coat to protect it. These are possibilities well worthy of consideration, but until they have been tried or others of like character we cannot hope to keep stocks of highly inflammable coal in profitable bulk. It will be necessary to submerge it, or spread it in thin layers pneumatically over a large area and gather it in a similar manner.

The Bill against Strike Breaking

A bill has been introduced by John M. Evans, representative from Montana, making it unlawful to transport strike-breakers over state lines and to tranship arms from state to state for the defense of such men.

The only reason for forbidding the transportation of strike-breakers is to protect workingmen who are making just demands which should be granted. But this law equally protects also men who are striking for something which is not just. Thus the Industrial Workers of the World might strike to have the Western Federation of Labor men excluded from the Montana mines and if they did, the copper producers would have a restricted output and the railroads would be obliged to refuse transportation to the duly unionized Western Federation men if the company should "hire, employ or engage them." Moreover, the railroad would be forbidden to "transport, handle or carry any firearms or ammunition" for their defense.

In fact, the disorderly Industrial Workers of the World might drive out the Union and then prevent it from being recruited. All the violent actions in Butte, Mont., recently show how probable such a condition would be. The I. W. W.'s deliberately blew up the Federation safe and destroyed the building in which Federation men met. A few men were killed and a large number were victims of violence. A little more and the I. W. W.'s would have had unquestioned control, the Federation would have been driven out entirely and under this law, had it then existed, no new men could have been introduced and had they come in they could not have been defended.

We think the workingman really needs protection against the workers in some industries, who in knowing their strength raise wages abnormally, all of which other workers have to pay. Some of these trades limit those working in them to those having relations already in the Union and only a limited number of such relatives are counted as granting elegibility. One can become a glass blower if one's father or father-in-law has blown or is blowing glass, but not otherwise, though one may have worked at all the related labor in a glass factory.

The assumption in legislation such as we are discussing, is always that the workingman in a mass is right. What he wants he should have. But there is nothing to lead one to a judgment of this kind. He is, of course, certainly not always wrong and sometimes his cause is debatable, but prohibiting the importation of strike-breakers in every case is to assume that the employee who has struck is invariably right.

Let us suppose that one man, as often happens, incurs the dislike of the agitating force at a colliery. The mine becomes idle and the company can either discharge the man or seek men who are willing to work with the man in question. But now this last recourse is removed. The one man must be discharged and his rights are over-ridden by his fellows. We believe that the law Mr. Evans would enforce is a gross violation of individual rights. Labor which for centuries has struggled for freedom is now endeavoring to restrict its own rights by a series of arbitrary laws.

Eventually laboring men will learn that the larger trades employing the greater number of men will be able to tyrannize over all others and wages will be earned above the normal rate. The importance of these larger trades will be so great that the fear of their idleness will make the public take a favorable hand in the settlement of their strikes. Thus they will receive year by year an increased wage and the cost of their product will grind to the ground those workers whom chance will have kept out of such favored employment.

Legislation like that Mr. Evans advocates will prevent the man in one state who is getting $1.75 a day from going to another and making from $4 to $5. The United States will be a bitter jest to such a man who feels he is a citizen and yet receives the treatment of a man from Japan or China.

Legal Department

Diplomatic Controversies Concerning Coal as Contraband of War

By A. L. H. Street*

Moore's Digest of International Law, which was published a few years ago by the United States as a public bulletin, quotes several interesting documents as showing the attitude of nations toward coal as a contraband of war.

One of the documents, a communication from Mr. Cass, Secretary of State, to our minister to France, sent in 1859, reads, in part:

"The discussion which at this time is going on respecting the military character of coal, and whether it is now excluded from general commerce as contraband of war, is a striking illustration of the tendency to enlarge this power of prohibition and seizure, and of the necessity of watching its exercise with unabated diligence. Here is an article, not exclusively, nor even principally used in war, but which enters into general consumption in the arts of peace, to which, indeed, it is now vitally necessary. It has become also important in commercial navigation. It is a product of nature with which some regions are bountifully supplied, while others are destitute of it, and its transportation, instead of meeting with impediments, should be aided and encouraged. The attempt to enable belligerent nations to prevent all trade in this most valuable accessory to mechanical power has no just claim for support in the law of nations; and the United States avows its determination to oppose it as far as its vessels are concerned."

Mr. Moore then quotes a declaration issued by a Spanish admiral in 1866, during a war between Spain and Chile and Peru, declaring coal to be contraband when coming from the Chilean mines. The declaration was partly based on this ground: "That a belligerant has a right to declare new articles to be contraband of war, when from the circumstances of the war they become, on the part of the enemy, elements for undertaking and carrying on hostilities." It is qualified, however, by the statement: "This declaration, confined as it is to a special case and peculiar to the present war, is not intended to establish any precedent with respect to the general principle, that coal should not be considered contraband of war." At the same time, the President of Peru issued a proclamation declaring coal to be contraband when destined for the use of Spanish ships of war.

This interesting statement, made by the United States Commissioner of Navigation in 1898, is, also, quoted: "Had coal been declared unconditionally contraband of war, the precedent would have been awkward in the event of war between foreign nations, where the United States as a neutral would desire the largest opportunities for the exportation of coal."

The Russian Government having declared coal to be unconditionally contraband in 1904, the British Government pointed to a declaration by the former government in 1884 that coal should not be deemed to be contraband. The officials of the Russian Government replied that they were justified in changing their views, "since 1884, during which time many developments and circumstances had occurred which had induced them to modify their opinion."

The opposition of the United States to the policy of declaring coal to be absolutely contraband is illustrated by the following extract from a message issued by Mr. Hay in 1904 to ambassadors in Europe: "In the wars of 1859 and 1870, coal was declared by France not to be contraband. During the latter war, Great Britain held that the character of coal depended upon its destination and refused to permit vessels to sail with it to the French fleet in the North Sea. Where coal or other fuel is shipped to a port of a belligerent, with no presumption against its pacific use, to condemn it as absolutely contraband would seem to be an extreme measure. . . . Many nations are dependent on coal for the conduct of inoffensive industries, and no sufficient presumption of an intended warlike use seems to be afforded by the mere fact of its destination to a belligerent port."

*Attorney-at-law, St. Paul, Minn.

Recent Judicial Decisions

Acquisition of Title to Land by Adverse Possession—If owners of adjoining tracts of land in Pennsylvania treated a fence as being on the true boundary line between them for more than twenty-one years, each acquired good title to the land extending up to the fence on his side, regardless of whether that was the true line or not. (Pennsylvania Supreme Court, Miles vs. Pennsylvania Coal Co., 91 Atlantic Reporter 211.)

Right to Enjoin Mining Operations as Nuisance—In a suit to restrain mining operations near plaintiff's dwelling-house, on the ground that they constitute a nuisance, a temporary injunction will not be granted pending a final hearing of the case, where it appears that that would involve large loss to the mining company and throw its men out of work, and that the injury to plaintiff will be comparatively slight, especially if the conditions have existed for some time and have been endured by him. (Pennsylvania Supreme Court, Alexander vs. Wilkes-Barre Anthracite Coal Co., 91 Atlantic Reporter 213.)

Claim for Injury Barred by Contributory Negligence—The manager of a coal yard who was injured by collapse of a footwalk in the yard, which was rendered defective through negligence of employees of a railway company, whose track extended into the yard, cannot recover against the railway company, if he knew of the defective condition, or by exercising reasonable care for his own safety could have known thereof. (Pennsylvania Supreme Court, King vs. Lehigh Valley Railroad Co., 91 Atlantic Reporter 214.)

Duty to Keep Coal Dock in Safe Condition—A lessee of a dock used in handling coal is bound, as between himself and the public, to keep the premises in such condition that they will be reasonably safe for persons who go lawfully upon the premises by express or implied invitation; and is prima facie liable for damages caused by defects in or dangers on the premises that reasonably could have been avoided by appropriate care. This is the law even though, as between the lessor and lessee, the former has agreed to keep the dock in repair. (Florida Supreme Court,, King vs. Cooney-Eckstein Company, 63 Southern Reporter 659.)

Sociological Department

Washington Holds Its First State Rescue Meet

By J. Bagley*

SYNOPSIS—The operators, the Union, the American Mine Safety Association and the Red Cross hold a conjoint meet at Seattle, Wash., thus starting a movement to hold in the future a state-wide contest once every year.

The first state-wide mine-rescue and first-aid meet in the state of Washington was held in Denny Field, University Campus, Seattle, Washington, on July 22 and 23, by the miners and the operators of Washington under the auspices of the U. S. Bureau of Mines and the State Mine Inspection Department. This meet was the first of a series of annual events and was pronounced by all present to have been the most successful ever held in the state.

The contest was in charge of W. D. Ryan, U. S. Bureau of Mines, who also awarded the prizes; H. M. Wolflin, district mining engineer, U. S. Bureau of Mines, and a committee composed of J. J. Corey, U. S. Bureau of Mines; James Bagley, state mine inspector; D. C. Botting, commissioner, Washington Coal Operators' Association, and Martin J. Flyzik, president District No. 10, United Mine Workers of America. The judge in the mine-rescue contest was Thomas Graham, chief inspector of mines of British Columbia. The other judges were: Drs. Don H. Palmer, H. C. Ostrom, Frank Maxson, H. Housten, A. L. Loe, H. D. Dudley, J. Tate Mason, George N. McLoughlin, D. C. Hall and Major Edger, of Fort Lawton.

A miniature mine was constructed on the field and consisted of a drift 150 ft. long, on one side of which two rooms were shown connected at the first crosscut to represent work carried on in a flat seam, and on the other side an 8-ft. chute was erected on a pitch of 45 deg. and carried up 30 ft. to show how men were rescued in the pitching seams of the state. A smoke house was constructed in front of the mine and each helmet team underwent the test of remaining 5 min. in the smoke before entering the mine. An examination was made by a fireboss to show the method of procedure in mine inspection and reporting as carried on in practice. All men before entering the mine obtained their checks at a checking house near the mine mouth and checked in on their return from the mine.

Mines in the state of Washington are operated by 28 different companies in districts within a radius of 100 miles from Seattle and are scattered throughout the state. The U. S. Bureau of Mines maintains a mine-rescue station on the university campus in charge of J. J. Corey, foreman, for the purpose of giving assistance in times of distress and teaching men relief work throughout the state.

Eight teams participated in the contest representing the foremost companies in Washington. These were: No. 1, CleElum; No. 2, Franklin; No. 3, Roslyn; No. 4, Issaquah; No. 5, Roslyn; No. 6, Black Diamond; No. 7, Roslyn Fuel Co.; and No. 8, Ravensdale. It must be explained that some of the members of the corps that took part in the first-aid contest did not participate in the mine-rescue contest.

CONTEST OF FIRST DAY

The contest began at 1:30 p.m. of each day, and on the first day was as follows:

First-Aid Contest—No. 1. Team event—Time, 20 min. Simple fracture of right thigh; fifth and sixth ribs on left side broken; compound fracture of right wrist with bright red bleeding. Treat and carry 50 ft.

First-Aid Prize Winners, Cle-Elum Team No. 1

From left to right: E. E. Simpson, T. Barros, T. Summerill, captain, W. Ray, F. Ashurst, W. Saul

Mine-Rescue Prize Winners, Roslyn Fuel Co. No. 7

From left to right: T. Wallace, H. Taylor, W. Shaw, captain, E. Taylor, J. McGraw

No. 2. One-man event—Time, 7 min. Miner is overcome by gas. Remove 20 ft. to fresh air and perform artificial respiration for one minute.

No. 3. Two-man event—Time, 8 min. Simple fracture of right forearm; right lower jaw broken.

No. 4. Four-man event—Time, 15 min. Patient overcome by powder smoke; right forearm broken. Improvise stretcher and carry 100 ft.

No. 5. Three-man event—Time, 8 min. Head, face, neck, arms and hands burned by gas ignition.

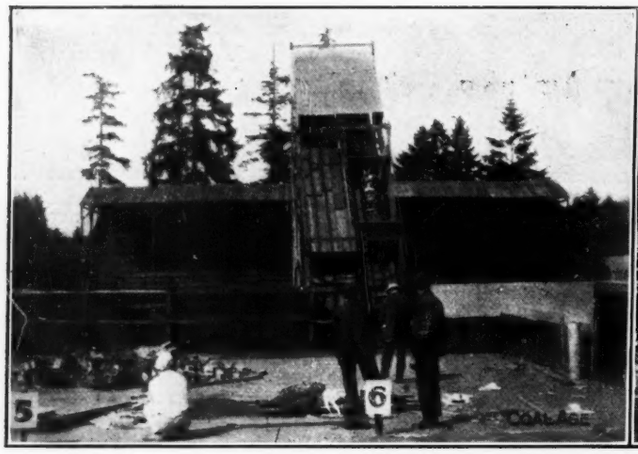
No. 6. Team event—Time, 15 min. Miner caught between loaded car and rib; right shoulder blade broken; left arm broken 6 in. above elbow; left foot crushed; lacerated right cheek; improvise a stretcher and carry 100 ft.

No. 7. Two-man event—Time, 10 min. Flesh torn off back of left hand; compound fracture of right arm.

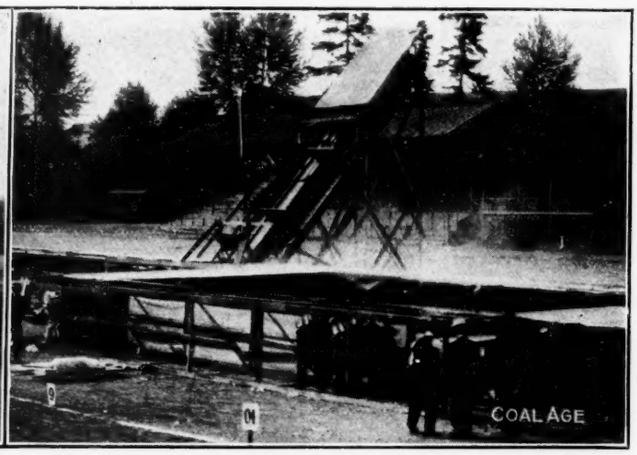
No. 8. Team event—Time, 20 min. Compound fracture of right thigh with severe arterial hemorrhage, and compound fracture of left forearm. Treat patient and carry 100 ft.

Mine-Rescue Contest—Team of five men, including captain, equipped with artificial breathing apparatus. Recovery work after mine explosion caused by blown-out shot. Carry miners rescued to air; perform artificial respiration for two minutes; treat for burns on face, hands and back.

*State mine inspector, 503-504 Alaska Building, Seattle, Wash.



TEAMS EXHIBITING MANNER OF BRINGING VICTIM DOWN A STEEP PITCH



MINE-RESCUE TEAMS REMOVING VICTIM AFTER A SIMULATED EXPLOSION

CONTEST OF SECOND DAY

The events on the second day were as follows:

First-Aid Contest—No. 1. Team event—Time, 20 min. Explosion of keg of powder, burning miner severely on face, neck, chest, back and both arms. Improvise stretcher and carry 100 ft. Treat patient.

No. 2. One-man event—Time, 8 min. Severe cut on forehead, right hand mashed.

No. 3. Two-man event—Time, 18 min. Man found lying with back across electric wire. Remove from contact and treat for electric shock.

No. 4. Three-man event—Time, 10 min. Right knee-cap fractured by fall of rock; left hand badly mashed. Improvise stretcher and carry 50 ft. Treat patient.

No. 5. Team event—Time, 20 min. Miner caught by flying coal from supposed missed shot. Right side of face badly cut; right eye blown out; simple fracture of right thigh; three lower ribs on left side broken. Treat and carry 100 ft.

No. 6. Team event—Time, 20 min. Miner with severely injured spine; fracture of right upper arm; treat and carry through tunnel and over obstruction.

Exhibition event not to be considered in contest.

Two-man event—Miner going back into chute too soon after firing a shot, overcome by powder smoke. Remove 20 ft. to gangway, perform artificial respiration for two minutes.

Note—A place to represent a chute will be built on the ground and all teams are expected to take part in this event if called on.

Mine-Rescue Contest—Team event—Mine fire. Seal off fire and remove one of helmet men in distress; carry to fresh air and revive.

Team will consist of five men, one of whom shall be captain.

The general rules governing the contest were the standard rules for governing first-aid and mine-rescue contests as used by the American Mine Safety Association.

AWARDS

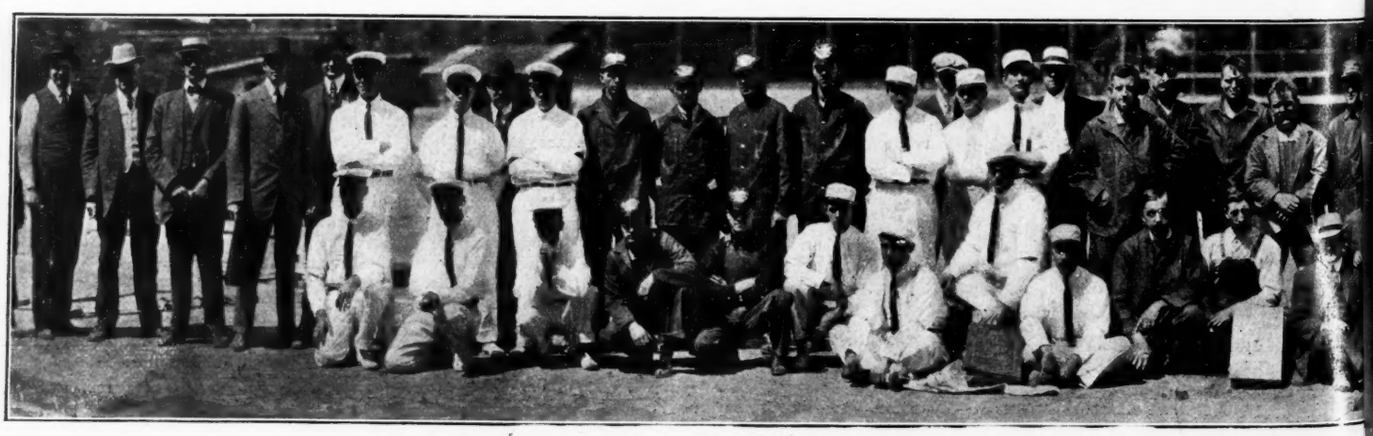
In the mine-rescue contest Team No. 7 of the Roslyn Fuel Co. won the first prize consisting of a silver cup and American Mine Safety Association medals. The Issaquah Team No. 4 won the second prize consisting of two Koehler mine safety lamps and three subscriptions to "Coal Age." The Roslyn Team No. 5 won the third prize consisting of five yearly subscriptions to the "Colliery Engineer."

In the team events of the first-aid contest CleElum Team No. 1 won the first prize consisting of a silver cup and American Mine Safety Association silver medals and Red Cross medals. This cup must be won at two consecutive state-wide meets to be retained by the team. The Roslyn Fuel Co. Team No. 7 won the second prize consisting of American Mine Safety bronze medals, American Red Cross certificates and one Johnson & Johnson first-aid cabinet. The Issaquah Team No. 4 won the third prize consisting of one Bauer & Black first-aid cabinet.

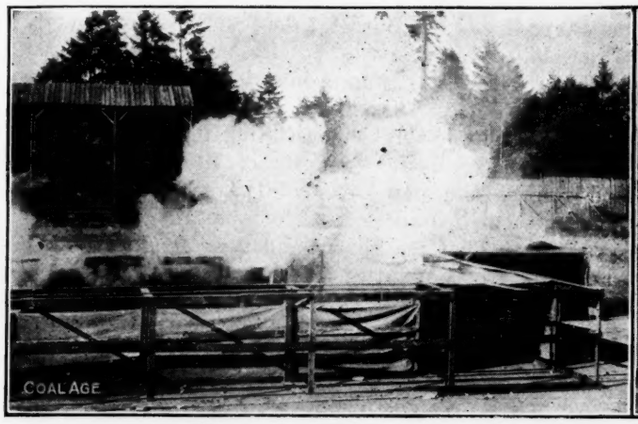
In the one-man events the first prize, $4 cash, went to Black Diamond Team No. 6, and the second prize, two "Justrite" acetylene lamps, to the Roslyn Team No. 5. The first prize, $5 cash, of the two-man events, was won by the Issaquah Team No. 4, and the second prize, three "Justrite" acetylene lamps, was won by Franklin Team No. 2. The first prize for the three-man events, three one-year subscriptions to "Coal Age," was won by Black Diamond Team No. 6, and the second prize, $6 cash, was won by Ravensdale Team No. 8. The first prize of the four-man event, which was a silver cup, to be retained by the winning team, went to Roslyn Team No. 5, and the second prize, $5 cash and Baldwin mine lamps, was won by the Roslyn Fuel Co. Team No. 7.

Two silver cups were contributed by the E. I. DuPont de Nemours Powder Co., one silver cup and $15 cash by the United Mine Workers of America and $25 cash by the Denny-Renton Clay & Coal Co.

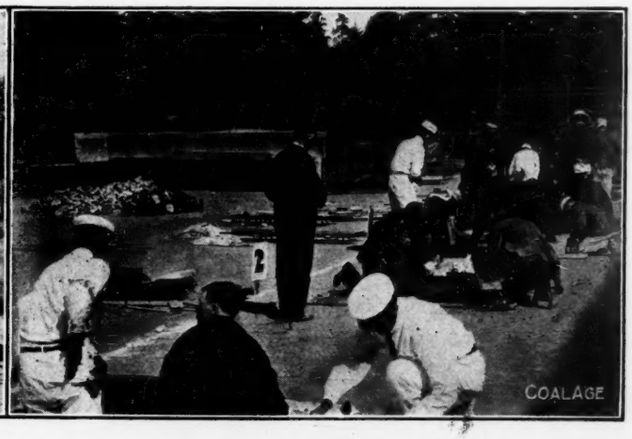
The competition was keen and the averages resulting showed that the improvement in first-aid and mine-rescue



PARTICIPANTS IN THE FIRST STATE-WIDE FIRST-AID AND MINE-RESCUE



THE BRATTICE-CLOTH HEADING AND A REPRESENTATION OF A MINE EXPLOSION



FIRST-AID TEAMS IN COMPETITION ON THE DENNY FIELD, UNIVERSITY CAMPUS

work in the state is bringing its devotees closer to perfection.

Among those taking part in the meet either as directors or as members of the corps, were the seven men who in 1911 attracted attention at the contest in Pittsburgh in competition with teams from all over the United States. The team was captained by J. Hutchinson, of the Northwestern Improvement Co.'s mine, and was made up of S. McCulloch, a member of the Roslyn Fuel Co. team; James Bagley, now state mine inspector; A. G. Lindsay, a member of Roslyn Team No. 3; D. C. Botting, former state mine inspector and now commissioner for the Washington coal operators, and J. Parker, a member of Issaquah Team No. 4.

Among the other prominent mining men present were: C. C. Andersen, general manager of the Northwestern Improvement Co.; J. Ash, superintendent of Roslyn Cascade Coal Co.; E. N. Brooks, general superintendent of the Washington Union Coal Co.; C. H. Burnett, retired coal operator; R. Christensen, superintendent of the Pacific Coast Coal Co., Black Diamond; Wm. Graham, chief inspector of mines, British Columbia; S. H. Ash, deputy state inspector of coal mines; Wm. Hann, general superintendent of the Pacific Coast Coal Co.; E. Jacobs, secretary, Western Branch Canadian Mining Institute; J. F. Menzies, manager Carbon Hill Coal Co.; A. Patrick, vice-president, Roslyn Cascade Coal Co.; C. E. Jones, general superintendent of Roslyn Fuel Co.; G. Rockefeller, superintendent Fairfax Mine, Inc.; W. Warnock, superintendent Franklin District Pacific Coast Coal Co., and D. R. Swen.

Much credit for the success of the meet is due to the committee in charge for its earnest work in arranging and conducting the contest, to H. M. Wolflin and W. D. Ryan, of the Federal Bureau of Mines, who gave much time and attention to the promotion of the meet; to Henry Landes, president of the State University, for his assistance in obtaining the labor and field equipment, and to the Coal Mine Operators' Association and miners for their hearty coöperation.

J. D. Ryan, of the Federal Bureau of Mines, concluded the program by awarding the prizes and giving a speech in the course of which he congratulated all the teams and expressed much gratification with the excellent work of the contestants.

Welfare Work at Weyanoke W. Va.

SPECIAL CORRESPONDENCE

R. D. Patterson, vice-president and general manager of the Weyanoke Coal & Coke Cc., ever seeking to provide a means for increasing the returns to his stockholders, while raising the income of his workmen, has adopted the sound principle of providing playgrounds for the children, tennis courts and baseball diamonds for the young. At the same time he has stimulated an interest in vegetable gardening, flower gardening and sanitation among the miners and their families. Not only is this done by kindly words of advice, but by thoroughly competent lectures and personal instruction in gardening, and by furnishing, gratis, all seeds, lime and fertilizer desired. In order to stimulate a wholesome rivalry, substantial prizes, varying from $20 in gold down to $2, were awarded to the successful contestants.

Saturday, July 24, 1914, was a day of pleasant anticipation in the town of Lowe, the unpretentious, though prettily nestling village which has grown up about the plant of the Weyanoke Coal & Coke Co.; for the judges

MEET IN THE STATE OF WASHINGTON, HELD AT SEATTLE, JULY 22 AND 23

of awards in the several contests, E. A. Schubert, industrial agent of the Norfolk & Western Ry., an expert in agriculture and horticulture, C. A. Honaker, of the Bluefield *Daily Telegraph*, a local expert on sanitation, and Shutt Grady, of the Pocahontas Coal & Coke Co., were there inspecting and noting and finally deciding to whom the prizes should be awarded.

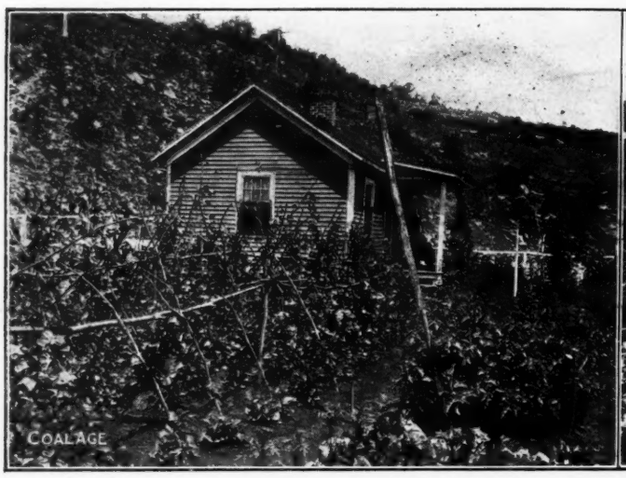
Gardens Have Made Lowe a Healthy Town

The excellent work accomplished by these men, women and children, which may be accepted as an outward expression of the contentment and happiness within, caused the judges frequently to stop and wonder why it was that the management of all industrial plants, even small municipalities, did not adopt this means of increasing the contentment, health, happiness and efficiency of the citizens of the community.

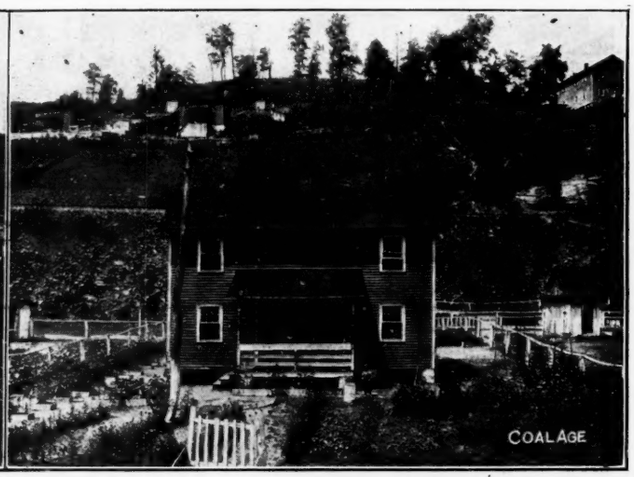
Much to the credit of the Weyanoke Coal & Coke Co., it may be said that not one case of serious illness has occurred at Lowe in over six years and typhoid fever is a name only. Finally, after much hesitation, for out of the hundreds of gardens viewed, it was difficult to chose winners, the judges made the awards.

The first prize for gardening, $20 in gold, was awarded to Frank Barton; the second prize in gardening, $18, was awarded to J. L. Burnett; the first prize for flowers, $5 in gold, was also awarded to Mrs. J. L. Burnett; and the first prize in sanitation, a luxurious lawn swing, was awarded to James Gordon, colored.

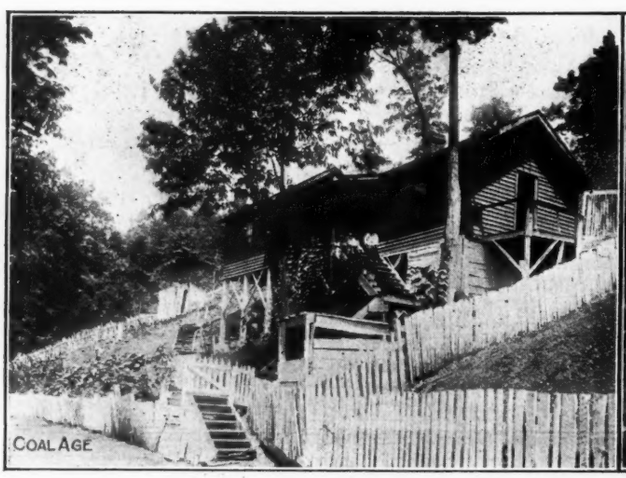
This company is ably demonstrating the fact that giving its miners all the comforts of life possible pays good returns and increases their physical vigor, making it possible for them to give more in return in a day's work. That the miners and their families receive a larger return is admitted at once, and it is only necessary to say that the vegetables in some gardens were valued at over $150, and few gardens there were that did not appraise at $50. The produce obtainable will total upward of $4000.



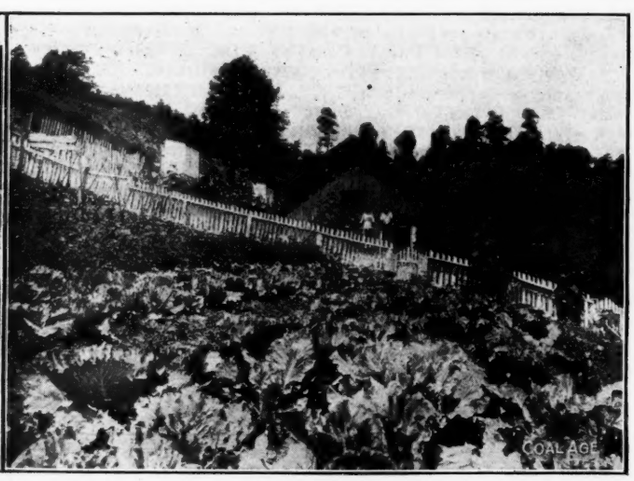
Garden Which Received First Prize



One of the Flower Gardens



The Most Sanitary Premises



A Prize-Winning Garden

Every square foot of bare pipe carrying saturated steam at a temperature of 330 deg. F. (100 lb. gage pressure) will represent a loss of 625 B.t.u. with a surrounding atmospheric temperature of 62 deg. F. There are various insulating materials in general use and tests show that the percentage of saving over bare pipe are as follows: Hair felt, 87 per cent.; magnesia, 87 per cent.; asbestos, 89 per cent.; silicated cotton, 90 per cent.; magnesia sectional covering makes a neat and firmly effective lagging, but has the objection that it will not stand much handling. It is, however, for its cost perhaps as effective a covering as can be obtained. Hair felt is now never used with the highest temperatures owing to the danger of combustion.

American Mine Safety Association

The following is the program of the Association for its meeting in New York City at the Waldorf Astoria, Sept. 7-10.

Sept. 7—Morning, sight-seeing and getting settled. 2 p.m., address of welcome. Reading of minutes. Report of executive committee. Meetings of subcommittees. Evening, entertainment.

Sept. 8—Morning, business session. Committee reports. Afternoon and evening, excursion to Coney Island by boat. Shore dinner.

Sept. 9—Morning, business session. Committee reports. Afternoon, closing business session and adjournment. Visit to Museum of Safety in Engineering Societies' Building.

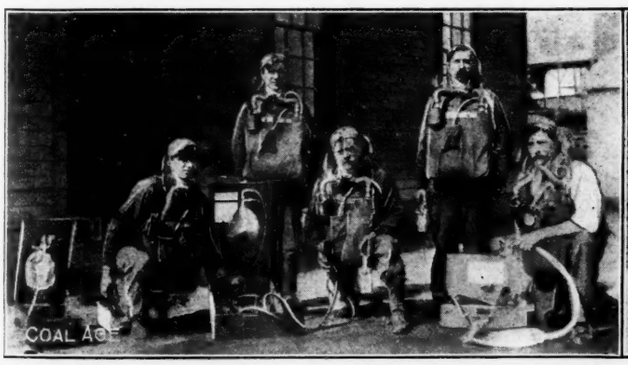
Sept. 10—All-day excursion around Manhattan Island, with visit to New York Edison Co. at 38th St. station, and to the work of the Public Commission in tunneling the Harlem River.

The Edison companies have developed several exceptionally valuable methods of guarding against shocks from currents of high voltage and a visit to their works will well repay those who are interested in electrical work. Ladies will be welcome and a special program is being prepared though in all cases the trips to points of interest will be open to both ladies and gentlemen. The trip around Manhattan has been substituted for the advertised visit to the yacht race because that race is deferred for a year.

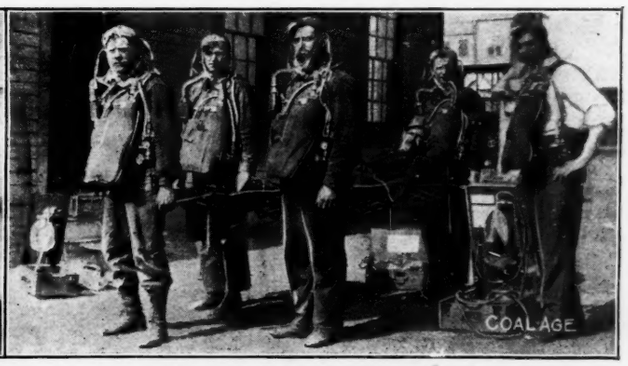
The field meet will be held at Terre Haute, Ind., on Sept. 12, at Central League Baseball Park. In the evening, there will be a smoker and social session. Dr. J. A. Holmes, director of the Bureau of Mines, J. P. Reese, president of the American Mine Safety Association, Governor Ralston, Mayor Roberts and others are on the program as speakers.

Everyone who is interested in the mining industry is invited to be present at the meet. No admission will be charged. All squads desiring to enter should notify either H. M. Wilson, secretary American Mine Safety Association, or the Bureau of Mines, both at Pittsburgh, Penn., or Dr. August F. Knoefel, Terre Haute Trust Building, Terre Haute, Ind. This notification should come through the superintendent of the company by whom the contestants are employed.

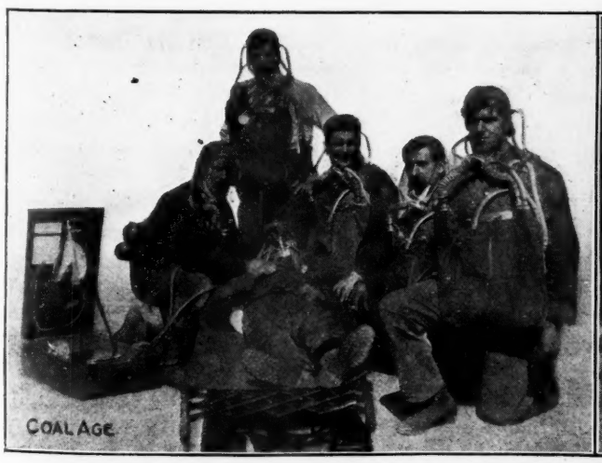
Mine-Rescue Work in Canada



Rescuemen No. 6 mine



Transporting patient on stretcher



Pulmotor work

Lifting the patient onto stretcher

MINE-RESCUE TEAMS AT STATION NO. 1, HARDIEVILLE, LETHBRIDGE, ALBERTA

Discussion By Readers

Problems in Rescue Apparatus

Letter No. 2—Referring to the recent discussion in reference to the reactions that take place in the human body and, particularly, to the relative volumes of oxygen consumed and carbon dioxide exhaled, COAL AGE, June 27, p. 1062, the following information will be of interest, coming as it does in response to my request, from an eminent physiologist in England, who writes:

"In the description of breathing apparatus used in mine-rescue work it is commonly stated that 2 liters of oxygen per minute or 120 liters per hour is supplied to the wearer. That is the amount of oxygen required by a man when doing moderately hard work. His output of carbonic acid or carbon dioxide will be approximately the same, namely, 120 liters per hour; and the absorbent provided must be capable of taking up that amount of carbonic acid per hour. The amount of carbonic acid breathed out is the same as the amount of oxygen taken in when a man is oxidizing carbohydrate food, and getting the energy of the work he is doing entirely out of that carbohydrate.

"By carbohydrate food I mean such food as starch, which is one of the chief constituents of bread, potatoes, sugar, etc. If a man is oxidizing fat or protein, which is the chief constituent of meat, he will not expire quite as much carbonic acid as he inspires oxygen. This is because part of the oxygen is utilized in oxidizing the hydrogen in the fat or in the protein, and leaves the body in the form of water. This water is not excreted necessarily in the expired air; it may be passed out from the kidneys in the urine, or from the skin, in the form of sweat. At the most, less than one-third of the oxygen would be turned into water, supposing the man were doing his work on a diet of fat and meat.

"The more carbohydrate food a man eats (and that is the food that a workman takes most of), the more nearly will the amount of carbonic acid expired correspond to the amount of oxygen inspired. The relationship of carbonic acid expired to the oxygen inspired is given by physiologists as the quotient, expressed by the symbols CO_2/O_2, called the "respiratory quotient." On a carbohydrate diet this respiratory quotient equals 1, while on a diet of protein and fat it will more likely equal 0.75."

H. N. ELMER, Gen'l. Agent,
Siebe Gorman & Co., Ltd.

Chicago, Ill.

The "Mine-Ruin" Law

The writer of the article in COAL AGE, Aug. 8, p. 239, entitled "Magnifying Supposed Evils," is evidently much in the dark in regard to the far-reaching results of the mine-run law as affecting the Ohio coal trade. This fact, no doubt, enables him to look on what he terms "the bright side of the proposition." It is truly a commendable way to regard the difficulties that, from time to time, obstruct our path. It is always easier, however, to look on the bright side of a proposition in regard to which we are but slightly informed.

The coal operators of Ohio have looked in vain for any bright side in the practical operation of the mine-run law, with which they have been confronted. I am pleased to say, from my own knowledge, the editorial that appeared in COAL AGE, June 13, p. 974, and other similar ones, have stated the condition, in respect to this law in Ohio, correctly. While our Kansas friend, writing in COAL AGE, July 25, p. 155, makes it a trifle strong, from the standpoint in Ohio, there is not a shadow of doubt but that he is right when he sums up briefly the legitimate results of the mine-run law as "decreasing the revenue from the sale of coal by producing larger quantities of a lower-priced quality; causing the loss and abandonment of much coal that could be otherwise profitably worked; increasing mine accidents; . . . overcrowding the mines with unskilled and ignorant workmen, and finally destroying large areas of surface lands."

When we consider that a large majority of the coal companies in Ohio, today, are not making a dividend of 1 per cent. on their investment when running normal, it is not difficult to understand that if this slight margin is to be still further reduced by the inferior quality of the coal produced, together with an excessive amount of fine coal that must be paid for by the operator, it is only a question of time when the coal operators of Ohio will be driven to the wall.

When Mr. Hogarth attempts to reassure the Kansas correspondent with the statement that in the district where he is located (Pittsburgh district) "all the coal is mined on a mine-run basis," he is evidently of the opinion that Kansas is situated similarly in respect to both mining and market conditions. While I am not familiar with the conditions existing in Kansas and must accept as correct the correspondent's description of the workings of the mine-run law in that state as being disastrous, I *do* know conditions in the Ohio market and in the Ohio mines; and I can state positively that the operators of Ohio regard this act not as a mine-run law, but as a "mine-ruin" law. Such are the mining and market conditions in this state, that this law and the regulations governing its operation, can only bring disaster to the industry.

Referring again to Mr. Hogarth's letter, the mines in Heilwood are or were for years run nonunion, which rendered the matter of maintaining discipline in them much more simple than where the U. M. W. of A. has swing. While I am aware that 90 per cent. of the miners employed in those mines are foreign-born, they are not the I. W. W. element with which we have to deal in Ohio.

Without criticizing either union or nonunion mines or miners, the fact should be patent to everyone that the question of maintaining discipline in a nonunion mine is a much simpler problem than is presented in a mine where a union asserts its control. In the nonunion mine,

a violation of state law or mine regulations can be punished as it deserves; but the discharge of a man for a similar violation of law or regulations, in a union mine, is a serious matter, however flagrant may be the violation.

In the latter case the mine committee at once gets busy and, in many cases, the company must submit to their dictation in the matter or run the risk of a shutdown as a result, the men going out on strike until such time as the matter can be put up to the district officials for adjustment. Moreover, the decision is not apt to prove favorable to the company, who may win out eventually in the case of a violation of state law, but the process is slow and tedious. Many operators will put up with a rank violation of discipline rather than entail the expense and inconvenience of a shutdown.

In order to show the attitude of one of the highest officials of the U. M. W. of A. in respect to the policy he desired the miners to adopt in reference to laws they felt were injurious to them, permit me to quote from his recent speech advising the acceptance of the mine-run law, with its provisions for docking the miners for a certain amount of impurities found in their cars. He spoke in effect as follows:

By the provisions of this law, you must be fined by a Justice of the Peace for such violations of mine regulations. Now, men, we elect the Justices of Peace in all the mining districts; so let them provide for these fines in the law, and we, by our votes, will see to it that the fines are not enforced.

When a man who is a leader of an organization advocates the evasion of law through political power, it can readily be seen that it is a simple matter for the rank and file of the organization to follow his bidding.

If coal mining were as profitable as many think it is, it would be of great advantage for operators in different states to come together and discuss problems of general interest, and thereby learn of each other's difficulties, and how they may be best overcome. Under existing conditions, however, we must forego this pleasure and content ourselves with discussing such problems in a common forum. My conclusion is that the *mine-run law*, as far as Ohio is concerned, is bound to prove the MINE-RUIN LAW.

O. P. RATER.

———, Ohio.

Needed Education

It is with a feeling of regret and some anxiety that one observes the growing activities of the I. W. W. and kindred organizations. The drama recently enacted in the industrial affairs of Colorado and Ohio would seem to suggest, at least, the possibility that in some future day should these tendencies of man's primitive nature be allowed to gain a permanent ascendency, brute force might replace vested authority, and unreasoning demand take the place of calm judgment and justice. One might even imagine that the standing of the individual in a community, as in the days of barbarism, must soon depend on the strength of his right arm.

As was suggested in an editorial, COAL AGE, Vol. 5, p. 1058, the question may well be asked whether America is capable of assimilating the great tide of immigration now coming to her shores, and maintain the integrity of her standard. In the recent events to which reference has been made, one beholds a mad stampede of unreasoning destruction and barbarous cruelty. The actors in the drama were largely recruited from the foreign element.

The essential difference between the primitive and the civilized man is that the one is ruled by impulse, the other by reason. To avoid the admittedly rather vague possibility of this too impulsive foreign element eventually gaining control of our country, two solutions present themselves. They are as follows:

First, the exclusion of the morally uneducated and mentally undeveloped immigrant. It may be argued that, at the present stage of development, this would work a serious hardship on American industries, which, in a measure, is true.

Second, the need of what I would call the "moral education" of this primitive type, both native and foreign born. Certainly, this sounds like a difficult proposition; but when we remember that man is endowed by nature with reason, which enables him to anticipate his needs and makes him a law unto himself, it is clear that he has risen above the primitive level; and the morally educated man has overcome the blind instincts of the primitive man.

The education needed most, today, is the kind that will teach men how to live in peace and contentment. It should be recognized that the demand for an increased wage is inspired not so much by an existing necessity as by the desire for greater possessions. This desire, which is often an evidence of thrift and is commendable, if carried to excess may become a potent factor to crush out the refining influences of civilization, accelerating a reversion to the type. In avoidance of this, the needed education must show a man how to spend his money in a prudent manner; how to buy and prepare nourishing and wholesome food; how to furnish and decorate his home; how to make his surroundings sanitary and attractive; and last, but by no means least, it must teach foreigners how to speak and read the English language.

Until recent years, the assimilation of the foreign element has been left to take its own course, by gradual familiarity with American customs. At the present time, because of the increasing number, and the more closely drawn social lines, this method is no longer adequate; but moral education should be placed more and more in the hands of trained and competent teachers.

ERNEST L. BAILEY,
Mining Engineer.

Crumpler, W. Va.

Safety in Relation to Cost of Production

In the many articles and papers that have been written and read in support of the safety-first idea, in respect to coal mining, it is remarkable that the economic side of the question has been wholly disregarded. In my opinion, this is a subject that should receive the most careful consideration.

To avoid being misunderstood, let me say that safety has been my watchword as long as I can remember, indeed from the time I first came to understand the meaning of the word. While I know and appreciate the importance of making conditions safe in all mining work, I regard it as equally essential to study the economic aspects of the production of coal. There is as great ne-

cessity for producing coal at a profit as there is to produce it under safe conditions. As an industry, a mining proposition is without value unless the dividends are assured. Few, if any, men engage in the coal-mining industry for love of the work or for amusement; the acquisition of wealth is the motive. An old saying is to the effect that "the desire to acquire wealth is the greatest incentive to progress."

These reflections make it clear that the profits in coal mining are an essential part of the proposition. The safety-first idea must not be regarded too strongly from the side of sentiment. Sentiment is a poor diet for a hungry man. The young man who hopes to acquire a fair knowledge of mining without close application and hard work will never make a practical success, until he is able to grasp the situation as a whole, and apply his knowledge so that it will prove to be more than a sentiment.

The safety-first movement must not be allowed to degenerate into a sentiment; it has a practical side, which must be regarded. We live in an age of competition. Coal operators in different mining districts compete for trade in the same market. They mine their coal under conditions that vary widely. These conditions, and the varying charges for transportation, greatly modify the profits for the same quality or grade of coal.

The situation is further embarrased by the fact that a low-grade coal costs practically as much to mine and transport to market as a high grade coal, while the wide difference in the selling prices of these two grades makes the mining of the one a lucrative proposition, while the other must often be sold on the market at a loss. I recall now two instances of this kind where one coal mined at 95c. per ton sold at $3.50 per ton, f.o.b. mines, while another coal in the same market, mined at 88c. per ton, only brought $1.07, f.o.b. mines.

These few thoughts are expressed in the earnest hope that some of the readers of COAL AGE may give their opinions, and that the discussion may prove helpful, by drawing attention to the economic consideration in relation to the safety-first movement. What are the essential requirements to secure reasonable safety in the mining of coal, and to what extent must small operations be burdened with their obligation?

In my opinion, the most earnest efforts should be made to bring the coal trade to a basis of greater uniformity, and thereby avoid as far as possible the present state of affairs in this regard. I believe that economy of production and safety of operation are closely allied factors of the coal industry.

W. CROOKS.

Wylam, Ala.

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

RELATIVE MEASUREMENTS

A common method of making physical measurements for the estimation of weight, volume, heat, etc., is by reference to some adopted standard. All such measurements are relative and are frequently termed "specific." Such, for example, are **specific gravity, specific volume, specific heat,** etc. The atomic weight of elements is often called **specific weight.**

The Elements—An element is a substance that has not, as yet, been resolved into parts of a different nature and is, therefore, regarded as being composed wholly of one kind of matter or **simple,** in contrast with a **compound,** which is composed of two or more elements or kinds of matter.

The following table gives the more important elements, together with their chemical symbols and specific or atomic weights:

TABLE OF THE MORE IMPORTANT ELEMENTS

International Committee (1910)

Elements	Symbols	Atomic weights H = 1	Atomic weights O = 16	Elements	Symbols	Atomic weights H = 1	Atomic weights O = 16
Aluminum	Al	26.9	27.1	Manganese	Mn	54.49	54.93
Antimony	Sb	119.3	120.2	Mercury	Hg	198.4	200.
Argon	A	39.6	39.9	Molybdenum	Mo	95.23	96.
Arsenic	As	74.35	74.96	Nickle	Ni	58.21	58.68
Barium	Ba	136.27	137.37	**Nitrogen**	**N**	13.9	**14.01**
Bismuth	Bi	208.34	208.	Osmium	Os	189.37	190.9
Boron	B	10.91	11.	**Oxygen**	**O**	15.88	**16.**
Bromine	Br	79.28	79.92	Palladium	Pd	105.9	106.7
Cadmium	Cd	111.5	112.4	Phosphorus	P	30.77	31.
Caesium	Cs	131.75	132.81	Platinum	Pt	193.44	195.
Calcium	Ca	39.77	40.09	Potassium	K	38.78	39.1
Carbon	**C**	11.9	**12.**	Radium	Ra	224.6	226.4
Cerium	Ce	139.13	140.25	Rhodium	Rh	102.08	102.9
Chlorine	Cl	35.18	35.46	Selenium	Se	78.6	79.2
Chromium	Cr	51.53	52.	Silicon	Si	28.1	28.3
Cobalt	Co	58.5	58.97	Silver	Ag	107.02	107.88
Columbium	Cb	92.75	93.5	Sodium	Na	22.82	23.
Copper	Cu	63.06	63.57	Strontium	Sr	86.92	87.62
Fluorine	F	18.85	19.	**Sulphur**	**S**	31.81	**32.07**
Gold	Au	195.62	197.2	Tellurium	Te	126.48	127.5
Helium	He	3.97	4.0	Thallium	Tl	202.37	204.
Hydrogen	**H**	1	1.008	Tin	Sn	118.05	119.
Iodine	I	125.9	126.92	Titanium	Ti	47.72	48.1
Iridium	Ir	191.56	193.1	Tungsten	W	182.53	184.
Iron	Fe	55.4	55.85	Uranium	U	236.59	238.5
Lead	Pb	205.44	207.1	Vanadium	V	50.79	51.2
Lithium	Li	6.94	7.	Zinc	Zn	64.85	65.37
Magnesium	Mg	24.13	24.32	Zirconium	Zr	89.88	90.6

The above table contains only 56 out of the 80 or more elements that have been discovered, many of which are so rare as to be of little practical importance. The values of the atomic weights are given referred both to hydrogen as unity and oxygen as 16. The heavy type indicates the values commonly used in the study of mine gases.

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The elements form the basis of all relative measurements with respect to weight, density, volume; and it has been discovered that there is an intimate and close relation between the atomic weight and the specific heats of substances.

Illustration—The density of air, referred to hydrogen as unity (H = 1), can be calculated from the relative weights and volumes of oxygen and nitrogen, which are the chief constituents of air. The composition of pure air, by volume, is practically, ogygen (O) 20.9 per cent., nitrogen (N), 79.1 per cent. Then, since the atomic weight of oxygen is 16 and that of nitrogen 14, the relative weight of 100 volumes of air, referred to hydrogen as unity is found as follows:

Oxygen,	20.9	× 16	=	334.4
Nitrogen,	79.1	× 14	=	1107.4
Air,	100	*vol's*	=	1441.8

Therefore, one volume of air is 1441.8 ÷ 100 = 14.418 times as heavy as the same volume of hydrogen; or, the density of air referred to hydrogen is 14.418.

The percentage composition of pure air, by weight, is readily calculated from the above figures: thus:

Oxygen, $\frac{334.4 \times 100}{1441.8}$ = *say* 23.2 *per cent.*

Nitrogen, $\frac{1107.4 \times 100}{1441.8}$ = *say* 76.8 *per cent.*

Molecular Volume—Chemical hypothesis assumes that the molecules of simple substances each contain two atoms only, while the molecules of a compound substance may contain any number of atoms, but never less than two. Notwithstanding this multiplicity of atoms, **Avogadro's law** makes all gases, with a few unimportant exceptions, to contain the same number of molecules, per unit volume, when measured at the same temperature and pressure.

In other words, **all gaseous molecules, with few exceptions, are of the same size, at the same temperature and pressure.** This law holds true for all mine gases, and is important in the calculation of the relative volumes of gases concerned in chemical reactions.

Atomic Heat—An important relation has been found to exist between the atomic weights of the elements and their specific heats. Dulong and Petit (1819) found that the specific heat (relative heat capacity) of most of the solid elements vary inversely as their atomic weights, so that the product of these two factors is a constant quantity (6.4), which has been properly called the **"atomic heat"**; and represents the common heat capacity of the solid elements, taken by weight in proportion to their atomic weights. The following are a few examples:

	At.wt.		*Sp.ht.*		*At.ht.*
Iron,	55.85	×	0.1190	=	6.6
Lead,	207.10	×	0.0305	=	6.3
Mercury,	200	×	0.0333	=	6.6

Inquiries of General Interest

Keeping Rooms on Sight

Having had some difficulty in keeping the rooms in our mine on the proper sight lines, I would like to ask for any suggestion as to the best method to employ that will enable the miners to drive their rooms in a straight line and parallel to each other. The usual method and the one that we have employed is to drive two plugs into holes drilled in the roof slate, on line or in the direction the room is to be driven. These plugs are about 3 ft. apart or less, and strings called by the miner "sights" are hung from tacks or nails in these plugs.

These sights are often lost; at other times they are wholly disregarded, with the result that the rooms frequently "hole" into each other. In a few cases, this has caused heavy roof falls and a serious loss of coal in the pillars, which had to be abandoned. A good, practical method of keeping rooms on line will be much appreciated by readers who have experienced the same difficulty.

MINE FOREMAN.

Middlesboro, Ky.

The difficulty to which correspondent refers is a common one. In most cases, the "sight lines" used by miners are not over 2 ft. apart. As a result, any slight variation in the position of these lines greatly magnifies the error at the face of the room. It is customary for a miner, from his position close behind the sights which he illumines with the light of his lamp, to line in the lamp of another miner held at the face of the coal, 30 or 40 yd. away. It is evident that the error of the line at the face may reach 3 or 4 ft.

A greater error, however, is liable to occur when these sights are extended and new sights put up in the room, unless the original sights have been carefully protected and the work of placing the new sights is done by an experienced person. To reduce the liability to error to a minimum, all sights should be extended and new sights put up opposite a breakthrough where it is possible to measure the distance between the sight lines of adjoining rooms.

A good suggestion has been made to the effect that sight lines are best extended by means of a chalk line on the roof. It is possible under a fairly smooth or uniform slate roof to establish a point in the roof some distance ahead, say opposite a breakthrough. If there are no timbers in the rooms, a chalk line can then be stretched between the entry sights and the point thus established. The cord is held taut and snapped against the roof, leaving a well defined line, which should then be marked by plugs at intervals.

All extensions should be made in the same manner, by stretching a chalk line between these plugs, and extending the same to the point where a new plug is to be placed. The usual sights 2 ft. apart can then be put up on this line as often as desired. In some cases, it may be considered better to go over the chalk line with a paint brush, making a permanent line, say 2 in. wide, and extending this as the room is driven forward.

Correction

Referring to the question of the transmission of electrical power as explained, COAL AGE, Aug. 1, p. 201, permit me to draw attention to a seeming oversight in the formula for finding the area of the wire required to transmit a current of 150 amp., a distance of one-half mile (2640 ft.), with a line drop of 19 volts. The constant 10.8 should be used instead of 21.6. This would reduce the size of wire required one-half.

In the same connection I would suggest, would it not, in this case, be better to assume a wire return, instead of a rail return?

E. B. WAGNER,
Kingston, Penn. Electrical Engineer.

We are glad to have correspondent draw attention to the oversight in the use of the double constant (21.6 mil-ft.) instead of the value 10.8, which should have been employed here, since the answer given assumes a rail return for which the pressure drop has already been deducted, leaving 19 volts as the permissible drop in the wire.

This answer was first prepared for a wire return, in which case the length of wire required is double the distance the power is to be transmitted, and the double constant (21.6) was used (Kent, 7th ed., p. 1033). But in order to show the more general case, in the transmission of power in coal mining, a rail return was afterward adopted without making the necessary change in constant.

The answer for a rail return should therefore read as follows:

$$Circ.\ mils = \frac{10.8 \times 2640 \times 150}{19} = say\ 225{,}100$$

The weight of a triple-braid, insulated copper wire of, say 250,000 circ.mils, as taken from manufacturers' tables, is 985 lb. per 1000 ft., or 0.985 lb. per ft. At 20c. per lb., one-half mile of this wire will cost $2640 \times 0.985 \times 0.20 =$ say $520.

On the other hand, however, assuming, as correspondent very properly suggests for the installation of a fan at some distant point on the surface, one-half mile from the power plant, a wire return, the required size of wire to transmit a current of 150 amp. a distance of one-half mile (2640 ft.), with a line drop of 275 — 250 = 25 volts is

$$Circ.\ mils = \frac{21.6 \times 2640 \times 150}{25} = 342{,}144$$

The weight of a triple-braid, insulated copper wire of say 350,000 circ.mils, as taken from wire tables, is 1345 lb. per 1000 ft., or 1.345 lb. per ft. At 20c. per lb. one mile of this wire would cost $5280 \times 1.345 \times 0.20 =$ say $1420.

Examination Questions

Questions for Examination of Mine Electricians

(*Continued from last issue*)

Ques. 30—Is a compound-wound motor, a constant-speed motor?

Ans.—No. A compound motor runs slower under load than with no load.

Ques. 31—On what does the speed of a motor depend?

Ans.—The counter current generated by the armature is a large factor in determining the speed of a series-wound motor when carrying a load.

Ques. 32—Why is the spider of a ring-wound armature made of brass?

Ans.—Brass is nonmagnetic. If iron or steel were used for this purpose these metals, being magnetic, would interfere with the magnetic field of the armature core.

Ques. 33—Does the voltage have any effect to decrease or increase the speed of a series-wound motor?

Ans.—The voltage of the electric current has little effect to change the speed of the motor.

Ques. 34—What is the average speed of the cutter-chain on a mining machine?

Ans.—The average speed of a cutter-chain is between 400 and 600 ft. per minute.

Ques. 36—If there is a break or an "open" in the resistance of a starting box of the common type, how would you locate the trouble and make quick repairs?

Ans.—Place the starting lever on the first button; then, with a screw driver or other piece of metal make connection between consecutive buttons, in order, till the break is found, as will be evidenced by the motor starting up. To repair the defect, place a "jumper" between those buttons where the break exists.

Ques. 37—Can an open circuit in an armature be detected by observation simply?

Ans.—An open circuit in an armature is frequently recognized by the greenish rings that appear to encircle the commutator, caused by the heating and oxidation of the copper, at that point.

Ques. 38—What is a compression cup?

Ans.—A compression cup is a grease cup having a spring-feed. A small spring forces a piston downward in the cup, by which means the grease is slowly driven out and lubricates the bearings.

Ques. 39—What is the wheelbase of a motor?

Ans.—The wheelbase is the distance between the centers of the extreme axles of the motor, and measures the base of support on the rail.

Ques. 40—Are chilled cast-iron or steel-tired wheels best for use on a locomotive?

Ans.—Steel-tired wheels give a greater tractive effort than cast iron, but cost more.

Ques. 41—How is the pitch of a gear ascertained?

Ans.—To find the pitch of a gearwheel, add 2 to the number of teeth and divide the sum by the diameter of the wheel in inches.

Ques. 42—What is the least number of teeth used in a pinion?

Ans.—In common practice, pinions are seldom designed with less than 12 teeth; but, in special cases, pinions of 5 teeth have been used, and 9 teeth are not uncommon.

Ques. 43—What is a castle-nut?

Ans.—A castle-nut is a nut having slots cut across the top, for the purpose of inserting a cotter-pin through a hole in the bolt, to keep the nut from unturning.

Ques. 44—What are the dimensions of a standard half-inch nut?

Ans.—A cold-pressed half-inch nut is ½ in. in thickness and ⅞ in. measured between the flat faces of the nut. The dimensions of a finished nut are slightly less than these, owing to the grinding down of the metal surface.

Ques. 45—What is the difference between a capscrew and a bolt?

Ans.—A capscrew is a bolt withiut a nut, the nut being the only difference between them.

Ques. 46—Is oil used when drilling cast iron?

Ans.—Oil is not commonly used, in drilling cast iron or brass, for the reason that, owing to the brittle nature of cast iron, the drill does not tend to heat as quickly as when drilling wrought iron or steel.

(*Answered by Request*)

Ques.—A mine sump is 60 ft. long, 10 ft. wide and 8 ft. deep. If this sump is full of water, how long will it take a pump to empty it, if the water end of the pump is 6 in. in diameter and operated at a piston speed of 100 ft. per min., assuming the efficiency of the water end to be 80 per cent.

Ans.—The sectional area of the water end is $0.7854 \times 6^2 = 28.274$ sq.in. At a speed of 100 ft. per min., the piston displacement of this pump is $(28.274 \times 100) \div 144 = 19.63$ cu.ft. Allowing for an efficiency of 80 per cent. at the water end, the quantity of water handled by the pump is $0.80 \times 19.63 = 15.7$ cu.ft. per min. The cubic contents of the sump is $60 \times 10 \times 8 = 4800$ cu.ft. The time required for this pump to empty the sump is then $4800 \div 15.7 = 305.7$ min., or 5 hr. 5.7 min.

Ques.—A current of 3000 cu.ft. per min. of air and gas is at its maximum explosive point; how much air must be added in order that the mixture will show a faint cap on a safety lamp?

Ans.—A firedamp mixture, at its most explosive point, contains 9.46 per cent. of gas. The volume of gas present, therefore, in this case, is $3000 \times 0.0946 = 283.8$ cu.ft. per min. Now, assuming that the first indication of a flame cap is seen, in the common unbonneted Davy lamp, when 2 per cent. of gas is present, the entire volume of gas and air required to produce this result would be $283.8 \div 0.02 = 14{,}190$ cu.ft. per min. The quantity of air to be added to the current, to produce this result, is then $14{,}190 - 3000 = 11{,}190$ cu.ft. per min.

Coal and Coke News

Washington, D. C.

Advices received from many sources continue to indicate that coal mining will probably be less disturbed as a result of the European war than almost any other industry in the United States, and that in some respects it will probably be stimulated by the war, as already indicated. Government officials have been reassured on this point by the data with respect to the shipment of coal from the mines which are now regularly supplied to them.

With respect to antnracite, the latest available figures received during the past week and made public indicate that last month's shipments were 5,391,897 tons, as compared with 5,487,852 tons in July, 1913, a decrease of 95,995 tons. Total shipments for the first seven months are about 2,000,000 tons behind those of last year, but this is apparently in no respect due to war conditions. On the contrary, the war situation is believed likely to aid in making up the shortage.

The amount of coal on hand at tidewater shipping ports decreased 39,630 tons from 554,120 tons on June 30 to 514,490 tons on July 31. The Lehigh Valley is reported to have led in tonnage last month with 1,026,225 tons, the Philadelphia & Reading second with 831,965 tons, and the Lackawanna third with 826,771 tons, the Erie fourth with 717,201 tons, the Central of New Jersey fifth with 708,891 tons, the Delaaware and Hudson sixth with 671,682 tons, the Pennsylvania seventh with 406,760 tons, and the New York, Ontario & Western eighth with 302,362 tons.

The opening of the Panama Canal, which is now ready for business, an official trip having been made in the S. S. "Ancon" on the 16th of August, while various merchant vessels have been successfully put through, is expected to cause an immediate demand for fuel supplies in the Zone. South American countries are already manifesting a sharp demand for coal of various grades, due to the cutting off of other supplies.

Secretary Lane's View of the Situation

Secretary Franklin K. Lane, of the Department of the Interior, in an interview regarding the effect of the war on the United States, makes the following statement:

A direct benefit to the United States from the European war will be its effect in making the people of this country realize to a greater extent the value of its mineral resources. It is entirely possible to so utilize these resources and expand our industries that the label "Made in America" will become familiar in our own and foreign markets.

Of an importance second only to that of the food supply is the supply of mineral products necessary to meet the requirements of twentieth century civilization. One of the first effects of the war has been to make us realize the interdependence of nations in the matter of food supply. Most of the countries now at war are dependent upon importation of foodstuffs, and we have cause for self-congratulation in the United States that we are able to feed ourselves. What we possibly have not so fully realized is that we are nearly as independent in the possession of essential mineral resources, and that the interference with manufacturing caused by interruption of the flow of importations of many necessary raw materials may be overcome almost wholly by development of neglected resources in our own country.

"Do you mean," Mr. Lane was asked, "that the United States can make itself independent of the rest of the world in its manufactures?"

"Very largely," asserted the secretary. "The main difficulties to be overcome are in the rearrangement of the distribution system necessary to establishing this independence. Business is established along certain well-marked channels, and usually follows the line of least resistance. It has been easier, and perhaps cheaper, to import mineral products and materials from other countries than to go to the trouble and expense of developing our own resources of the same nature. Forced to the latter course by suspension of commerce with other countries, I believe that American enterprise and energy will almost at once turn to the development of the native resources, rather than permit production to lag and supply to be diminished in any industry.

"The Southern States have for years largely supplied the world with phosphates, but because of the distribution system, a large part of this supply has gone to Europe, and much of the phosphates used in the Western States have been imported across the Pacific. We have some 3,000,000 acres of phosphate lands in the West lying near the smelters, from which is produced the sulphuric acid necessary to convert these phosphates into a form available for plant food, and still there is no law by which these deposits can be made commercially available, although a bill which would allow of their immediate development has been favorably reported by the Public Lands Committee of the House of Representatives, and is awaiting the aproval of the House and Senate.

"While the United States leads in coal mines, the six European nations now at war happen to be the six next largest coal-mining countries, producing together over half the world's coal. Interference with both the mining and the commerce of these nations must necessarily increase the demand for our coal, at least in the neutral countries of the world. And coal is our one resource about which there need be no present anxiety. The United States is now producing 40 per cent. of the world's supply, and the reserves yet to be drawn upon exceed, so far as known, those of all the rest of the world combined."

An Additional Feature of the Rate Decision

A feature of the recent opinion of the Interstate Commerce Commission in the advanced freight rate case, to which considerably more attention is being given (because of its bearing on future coal rates) than was accorded to it by traffic men at the time it was first made known, is the question of relative railway earnings with respect to the movement of various classes of products over the lines concerned. The comparison shows that under existing rate conditions, the average net revenue of the railroads from the hauling of bituminous coal is 3.24 mills per ton mile, while the average net revenue per loaded car mile is 16c. These figures compare with 5.60 mills per ton mile on coke and 21c. per loaded car mile.

On other commodities, the statistics show that in certain cases the average net revenue per ton mile ran as high as 12c. and over, while the average net revenue per loaded car mile ran as high as 28c. The lowest figure for average net revenue per net ton mile was 2.77 mills, while the lowest average net revenue per loaded car mile was 6c. Average net revenue per ton mile on most commodities ran from 4 to 7c.

It is thus seen that the net revenue obtained on bituminous coal was distinctly below the average when measured per ton mile. On the other hand, the total number of carloads for which statistics were obtained was much greater in the case of bituminous coal than in that of any other commodity, amounting to 64,430 carloads.

In summing up the situation, the Commission says:

Instances will be found of ton-mile earnings as low as 0.58 of a mill and car-mile earnings as low as 1.69c. Other rates, while yielding higher car-mile earnings, appear very low when the value of the commodity is considered. For instance, there will be found through or proportional domestic rates on copper bullion below 2 mills per ton mile; the average yield on 676 cars of this commodity, as disclosed by the exhibits mentioned, was only 2.73 mills per ton mile and 11c. per car mile, whereas the average yield on 2486 cars of pig iron was 4.31 mills per ton mile and 17c. per car mile. A compilation prepared by the Commission, showing the market prices for a series of years of the commodities covered by the traffic exhibits, together with representative rates thereon prevailing from time to time, will later be made available.

PENNSYLVANIA

Anthracite

Shamokin—Far up in a breast in the Cameron colliery of the Mineral R.R. & Mining Co., that had caved in early on Aug. 12, Leo Bulcosky was rescued late in the afternoon of Aug. 14 by a large force of men, headed by Superintendent William Reinhardt and State Mine Inspector P. F. Friel. When found, he was in fairly good condition, notwithstanding he had been without light or food ever since being made a prisoner. As he crawled through a small hole into the arms of his rescuers, he asked for water, and after a small quantity was furnished him he wanted bread. Liquid refreshments were furnished him, after which he was wrapped in blankets and removed to the surface. A big crowd of spectators cheered him as well as his rescuers, and he was placed in an ambulance and taken to the state hospital for treatment against physical collapse.

The threatened general strike of Philadelphia & Reading Coal & Iron Co. employees in the Shamokin, Treverton, Mt. Carmel and Locust Gap districts, 5000 employees being involved, was averted on Aug. 16. The members of the United Mine Workers met at Shamokin and voted to report for duty on Monday, Aug. 17, as they had reason to believe matters would be adjusted satisfactorily with the company.

The big Alaska colliery workings of the Reading has been idle since Aug. 10, when the employees quit work because the company insisted on their obeying the order to produce checks issued by the company and to report at a central headquarters every morning and evening.

Scranton—The annual contests between the first-aid teams of the Delaware, Lackawanna & Western R.R. Co. will be held this year at Sans Souci Park (Wilkes-Barre), on Saturday, Aug. 22, when all teams from Scranton, Kingston and Nanticoke districts will particupate. Dr. Lake and District Supt. H. G. Davis are making the arrangements. The contests should prove of more than usual interest, for the winning team is to represent the company at the contests in New York City, to be conducted under the auspices of the Federal Bureau of Mines.

Pine Grove—The Public Service Commission, on Aug. 13, gave permission to the Philadelphia & Reading Ry. Co. to discontinue the evening passenger service between Pine Grove and Outwood on days when the collieries are closed, there being no demand for accommodation.

Bituminous

Colver—The coal town of Colver is one of the few towns in this section of the state which has not felt the effects of the war in Europe. The officers of the Ebensburg Coal Co. state that they expect to be able to sell all the coal they can mine for a year, and are laying plans for a decided expansion in business. One of the improvement plans is a large repair shop where the company will be able to make all its own repairs on mine cars.

Meyersdale—Judge Ruppel, on Aug. 12, ordered C. J. Rowe and C. F. Rowe, owners of the C. F. Rowe & Bros. Co., to pay a fine of $25 and costs, following a hearing of charges filed against the company by State Mine Inspector F. W. Cunningham. It is alleged that C. J. Rowe, who is superintendent of the Hamilton mines, failed to countersign the weekly mine record books, and that C. F. Rowe failed to keep a fan going at all times, and that he failed to measure the air current and record it, as is required by the state bituminous mine law.

Pittsburgh—The Export Coal Co., on Aug. 10, filed suit against the Fidelity & Deposit Co. of Maryland to recover $11,984.99, said to be owing by the Frank Williams Co., of Buffalo, N. Y., for which the defendant became surety. The plaintiff alleges that in March, 1913, an agreement was made whereby the entire output of the Export Coal Co. was to be delivered to the Frank Williams Co. from Apr. 1, 1913, to Apr. 1, 1914. The Williams company paid for a short time for coal, then became in arrears, and the mine was idle. Small sums were paid now and then, and the mine would work a few days. Finally, on Mar. 4, 1914, the Williams company went into the hands of a receiver.

Charleroi—According to the monthly report of officials at Lock No. 4, more than 13,282,000 bu. of coal passed through the locks during July, a decrease of 3,000,000. In June, more than 17,000,000 bu. were towed through.

WEST VIRGINIA

Glenalum—On Aug. 14 a band of Italian bandits murdered three officials of the Glen Alum Coal Co. who were proceeding from the railway station to the mines, with between $10,000 and $15,000 in the payroll. The Italians escaped to the mountains with this money, but were located by a posse on Aug. 15 and the following day every member of the band was killed. These five men, however, for almost 24 hours, held a posse estimated at 200 men at bay, and were finally dislodged only by the use of high explosives.

Bluefield—Indications are for a general revival of activities in the Virginia and West Virginia coalfield. The mines which have been working half time throughout the summer are daily increasing their working forces, and it is considered but a matter of a few days before practically every operation will be working a full force. The mines affected lie in Russell, Tazewell, Motgomery and Wise countines in Virginia, and Mercer, McDowell, Mingo and Fayette counties in West Virginia.

Charleston—Reports from the Cabin Creek coalfield indicate that the mining and shipping of coal has taken a considerable boom during the past few weeks. It is said that more coal is now reaching the Chesapeake & Ohio main line over the Cabin Creek branch than ever before in the history of this field. The settlement of labor troubles in the Cabin Creek section, and the present European war, are expected to exert a powerful influence toward increasing the output.

Piedmont—Various improvements are being made at the mine of the Davis Coal & Coke Co., of Beryl, which has been idle since June 1. The Masteller Coal Co., with mines located at Hampshire, has completed another opening, which will give employment to about 45 or 50 men and further increase the present output.

KENTUCKY

Earlington—It is announced that the Victoria Coal Co. will develop an additional coal mine near here and will sink a 300-ft. shaft.

Louisville—The sale of the assets of the Central Coal & Iron Co., held a few days ago, was a part of the re-organization plans of that company, according to J. H. Small, secretary. Mr. Small is quoted as saying that the plan has nothing to do with the projected large merger of coal concerns in the western part of the state. Detailed information as to the re-organization plans is not yet available.

OHIO

Athens—One of the few suits filed as the result of personal injuries since the workmen's compensation law went into effect in Ohio was brought at Athens, recently, by the administrator of the estate of Fred Kaplar, the Manhattan Coal Co., of Nelsonville, being the defendant. Damages of $10,000 are asked. It is alleged that Kaplar was employed as a motorman in Mine 36 of the company, and that he was killed by a fall of slate on Oct. 29, 1913.

Congo—State Mine Inspector J. M. Roan and a number of deputies have arranged to open the Congo mine of the Sunday Creek Co., which has been sealed up for nine months because of fire. It is believed the fire is extinguished.

Wellston—The tipple and power house of mine No. 9 of the Superior Colliery Co., located near Wellston, were totally destroyed by fire recently. Burning embers dropped in the shaft and for a time threatened the mine but prompt work on the part of employees and mine inspectors saved it from burning. It will be two months before the mine can again be operated.

Massillon—After an idleness of four months and a half work has again started at the mines of the Peacock Coal Co. in the Massillon field. It is expected that practically all of the mines in that field will be in operation soon.

INDIANA

Terre Haute—A conference was recently held here to discuss the advisability of uniting the bituminous and block miners into one organization. Strong opposition developed There are about 21,000 bituminous and 1500 block miners and the latter are decreasing rapidly, with the exhaustion of the supply of block coal.

ILLINOIS

Zeigler—In removing the debris from the air shaft after a fire at the mine here, the body of one of the employees was found at the foot of the air shaft, in three sections. It is supposed that the man was trying to escape up the shaft and was overcome by the smoke and fell to the bottom, where the refuse cut and burned through his body. The local mine seems to be unfortunate, for only a week or so before the air shaft fire a fly wheel burst, not doing any damage to the property, however, with the exception of the engine house roof. Work has now been resumed.

Marion—Reports from all points in the southern Illinois mining field and as far north and west as Sparta and throughout Herrin, Jackson, Williamson and portions of Saline counties, are to the effect that several of the mines have had to rely upon the railroads to haul them a sufficient supply of water to operate the property. In some sections of the southern Illinois mining field there has been no rain for over three months, and all the ponds, lakes, streams and wells have dried up. Water, in some cases, is hauled many miles

Millstadt—Failure to successfully drill wells deep enough to secure an adequate supply of water has kept the large strip mine here, known as High Prairie, idle since last spring.

Johnston City—The First National Bank of this city has been ordered closed by the bank examiner. This condition of affairs is due largely to bad loans previously made, and the recent heavy demands for cash made by the foreign miners, who are getting ready to return to Europe in answer to the call for reserves from the different countries now at war.

WYOMING

Cheyenne—Wyoming mine operators recently met with representatives of the United Mine Workers in an attempt to adjust difficulties which were submitted a short time prior to the meeting. Chief among the demands made by the miners is the adoption of an eight-hour day from bank to bank, or from the outside to the outside of the mine. They do not ask for an increase of wages, with the exception of the shortening of the actual working time within the mine itself. Furthermore, a few additional safety rules are requested.

FOREIGN NEWS

Halifax, Nova Scotia—As a result of the unprecedented financial situation growing out of the European hostilities, it was recently decided to close a portion of the iron mines in Newfoundland, and the blast and openhearth furnaces at Sydney mines, on Cape Breton Island.

Nanaimo, British Columbia—South Wellington, the site of the Pacific Coast Coal Co.'s mines, six miles from Nanaimo, was recently destroyed by fire. Sixty houses were burned, also three stores, a poolroom, post office, and the Wellesley Lumber Co.'s saw mill. The loss is estimated at over $50,000 with little insurance. The upper works of the mine were not, however, damaged, and work here will be continued.

OBITUARY

Charles L. Hall, of the coal shipping firm of Hall Bros. & Co., and who was especially well known to the anthracite trade, died Aug. 15, at Ocean City, N. J., from injuries received by diving into a tank. He struck his head and died as a result of a fractured spinal column. Mr. Hall was 46 years of age.

Geo. L. Miller, of the Kettle Creek Coal Mining Co., died Aug. 12, at his home in Westport, Penn., of meningitis, superinduced by an affection of the heart. Mr. Miller was prominent in business and political circles. He was the Republican candidate for Assembly in 1912, and was elected State Committeeman from his county at the primary election in May last.

William Forrester, superintendent of the Cameron Coal Co., and one of the most prominent mine operators in Utah, recently died as the result of being struck by a cable while at the Cameron mine. Mr Forrester was born in Scotland in 1868, coming to this country when he was about 20 years of age. His family moved to Utah in 1890 and settled in Salt Lake, where Mr. Forrester has resided ever since. He is survived by his wife, six children, two brothers and one sister.

George Thomas, assistant mine foreman of the Babylon mine of the William A. Colliery, Lehigh Valley Coal Co., and George Cray, of the Lehigh Valley engineering corps were killed on Aug. 12, by a fall of rock. The engineering corps were making a survey of the mine and in their travels were obliged to go into the old workings Mr. Thomas and Mr. Cray preceded the other men in the corp when the fall came. Both men were killed instantly. Their bodies were crushed and mutilated, and it took considerable time to remove the rock. Mr. Thomas was nearly 70 years of age, while Mr. Cray was about 20 years old.

PUBLICATIONS RECEIVED

Department of the Interior, Bureau of Mines, Technical Paper 75. "Permissible Electric Lamps for Miners," by H. H. Clark. Twenty-one pages, 6x9 in.; illustrated.

Department of the Interior, Bureau of Mines. Bulletin No. 73. "Brass Furnace Practice in the United States," by H. W. Gillett. Two hundred and ninety pages, 6x9 in.; illustrated.

Department of the Interior, Bureau of Mines Technical Paper 70, "Methods of Oil Recovery in California," by Ralph Arnold and V. R. Garfias. Fifty-seven pages, 6x9 in.; illustrated.

Illinois Coal Mining Investigations, Bulletin 5. "Coal Mining Practice in District 1 (Longwall), by S. O. Andros. Forty-two pages, 6x9 in., with many drawings and illustrations.

University of Illinois, Engineering Experiment Station, Bulletin No. 74. "The Tractive Resistance of a 28-Ton Electric Car," by Harold H. Dunn. Fifty-three pages, 6x9 in., with many tables and curves.

Department of the Interior, Bureau of Mines, Technical Paper 78. "Specific Gravity Separation Applied to the Analysis of Mining Explosives," by C. G. Storm and A. L. Hyde. Fourteen pages, 6x9 in.; illustrated.

University of Illinois, Engineering Experiment Station, Bulletin No. 72. "Magnetic and Other Properties of Electrolytic Iron Melted in Vacuo," by Trygve D. Yensen. Seventy-one pages, 6x9 in., with many illustrations, diagrams and curves.

RECENT COAL AND COKE PATENTS

Furnace. F. Siemens, Berlin, Germany, 1,098,985, June 2, 1914. Filed June 13, 1912. Serial No. 703,554.

Coke Oven. S. A. Hoge, Rices Landing, Penn., 1,099,703. June 9, 1914. Filed Oct. 23, 1913. Serial No. 796,766.

Miner's Lamp. W. H. Logan, Carnegie, Penn., 1,099,753. June 9, 1914. Filed Nov. 22, 1912. Serial No. 732,812.

Gas Producer. J. A. Herrick, New York, N. Y., 1,100,074. June 16, 1914. Filed Feb. 27, 1911. Serial No. 611,032.

Dumping Grate. E. A. Wildt, Scranton, Penn., 1,100,412, June 16, 1914. Filed Jan. 25, 1913. Serial No. 744,226.

Mining Shaft. C. B. Rowley, Brainerd, Minn., 1,100,622, June 16, 1914. Filed May 13, 1913. Serial No. 767,330.

Miner's Safety Lamp. P. Wolf, Zwickau, Germany, 1,100,336, June 16, 1914. Filed Jan. 30, 1913. Serial No. 745,206.

Mechanical Stoker. Gustav de Grahl, Zehlendorf, Germany, 1,098,566, June 2, 1914. Filed June 3, 1913. Serial No. 771,450.

Coke Oven or Gas Furnace. W. Fricks, Bloomfield, N. J., 1,098,374, June 2, 1914. Filed Jan. 3, 1912. Serial No. 699,188.

Mining Machine Grizzly. O. H. Briggs, Providence, R. I., 1,098,934, June 2, 1914. Filed Mar. 24, 1911. Serial No. 616,636.

Forced Draft Hollow Grate Bar. J. H. Dietz, Kansas City, Mo., 1.100,125,June 16, 1914. Filed May 3, 1913. Serial No. 765,251.

Apparatus for Manufacture of Coal Gas. R. C. Congdon, Atlanta, Ga., 1,099,639, June 9, 1914. Filed Mar. 14, 1914. Serial No. 824,640.

Mining Machine. S. M. Mavor and H. A. Mavor, Glasgow, Scotland, 1,100,597, June 16, 1914. Filed Mar. 8, 1910. Serial No. 548,009.

Safety Appliance for Mine Hoists. W. E. Housman, Scottdale, Penn., 1,100,304, June 16, 1914. Filed Jan. 30, 1912. Serial No. 674,253.

Automatic Damper for Chimney Flues. J. Goerrien, Minneapolis, Minn., 1,100,296, June 16, 1914. Filed Apr. 21, 1913. Serial No. 762,605.

Method for Controlling Combustion. F. H. Brown, Ridley Park, Penn., 1,098,935, June 2, 1914. Filed Nov. 28, 1911. Serial No. 662,814.

Closure for Retort Coke Ovens. H. Koppers, assignor to H. Koppers Co., Chicago, Ill., 1,099,256, June 9, 1914. Filed July 8, 1913. Serial No. 777,831.

Safety Appliance for Mine Shafts. W. E. Housman and G. E. Huttelmaier, Scottdale, Penn., 1,100,184. June 16, 1914. Filed Sept. 10, 1912. Serial No. 719,686.

Blower for Boilers. T. S. Waller, assignor to Diamond Power Specialty Co., Detroit, Mich., 1,100,165. June 16, 1914. Filed Mar. 14, 1912. Serial No. 683,893.

Fastener for Sectional Coal Auger Nuts. J. H. Wenslick, assignor to Fulton Tool Works, Fulton, Ohio, 1,099,224, June 9, 1914. Filed Apr. 7, 1913. Serial No. 759,287.

CONSTRUCTION NEWS

Windber, Penn.—The Lochrie Coal Co. has a force of men working on its new mine opening at the Manges farm near here.

Hazleton, Penn.—G. B. Merkle & Co. have given the contract for the erection of a new breaker, to cost $60,000, to Wheeler & Reilley, of Wilkes-Barre.

Indiana, Penn.—A contract has been let for the construction of 5 miles of railroad along Yellow Creek from Homer City. This spur will connect a new opening with the Pennsylvania R.R.

Mt. Carmel, Penn.—Ground has been broken for the concrete foundations of the new breaker of the East Bear Ridge Coal Co., which is controlled by James Bros., of Mahanoy Plane

Shawnee, Ohio—The Hanna-Essex Coal Co., of New Straitsville, Ohio, has started to rebuild the tipple at the Shawnee mine. When completed the capacity of the operation will be increased to 600 tons daily.

Pekin, Ill.—The work of rebuilding the Wolschlag mine across the river from this point has been started. This structure burned two months ago. The new buildings will be of concrete and steel, and fireproof. The work will be pushed as rapidly as possible, and an effort made to get the mine completed for the winter season.

Chattanooga, Tenn.—A 20-acre tract in Alton Park has been accepted by representatives of the Durham Coal & Iron Co. as the site for the projected million dollar byproduct coke plant to be constructed here. Control of the property will be vested in the Chattanooga Gas & Coal Products Co. Lewis T. Wolle has been representing the interests of the promotors of the proposition

Lackawanna, N. Y.—Construction work on the new coking plant of the Buffalo Coking Co. at this place has been stopped, on account of conditions in Europe. Several hundred men have been laid off, and operations suspended indefinitely. This plant, which was being built by the Otto Coke Oven Co., was to be employed for supplying gas for the operation of the steel company's furnaces. It was to have been completed within the year, and would have employed three or four thousand men.

NEW INCORPORATIONS

Ft. Wayne, Ind.—The Evans Coal Co. has increased its capital stock $5000.

Seattle, Wash.—The Table Mountain Coal Co. has been organized with a capital of $200,000. The incorporators are Gustov A. German, E. A. Grunden, and Clara Cornell. Leon W. Bernard is the attorney for the firm.

Nashville, Tenn.—The Galloway-Eberhardt Coal Co. has been organized in Shelby County, with a capital stock of $30,000. The incorporators are Chas. S. Eberhart, June H. Rudisill, Carl S. Page, Charles S Eberhardt, Sr., and Samuel Schloss.

Fairmont, W. Va.—The Fairmont Rail & River Coal Co. has been incorporated with a capital stock of $300,000. The chief works will be in Marion County. The incorporators are Thomas S. Neptune, Ernest R. Bell, R. O. Nuzum, H. W. Alford, and Frank J. Wilfang, all of Fairmont.

St. Clairsville, Ohio—A number of Bellaire people recently received permission to incorporate as a company to be known as the Elkins Coal Co. The capital stock will be $10,000, divided into 100 shares. D. A. Elkins, L. E. Long, Alexander Gibson, Charles and Guy Dankorth, are the incorporators. All are from Bellaire.

INDUSTRIAL NEWS

Stewartsville, Ohio.—Several representatives of the Pursglove Maner Coal Co. have made a thorough inspection of the company's mines located at Stewartsville and Glencoe.

Columbus, Ohio—The Little Miami R.R. Co. has applied to the Ohio Utilities Commission for permission to issue $306,500 in guaranteed stock for the purpose of making needed improvements on its line.

Anderson, Ind.—A contract to supply the municipal light and water plants with coal for one year has been awarded to the Globe Coal Co., Indianapolis, at $1.10 mine-run and 75c. slack, f.o.b. The contract amounts to about $25,000.

Washington, D. C.—Proposed increased rates on bituminous coal from points on the Pittsburgh & Lake Erie R.R. to Wilmington, Philadelphia, and Baltimore, on traffic destined to points beyond these cities, were suspended Aug. 12 by the Interstate Commerce Commission.

Fayetteville, W. Va.—Shipments of coal over the Virginia Ry. during the past fiscal year broke all previous records, being an increase of 13.6 per cent. over the previous year. Compared with the fiscal year ending June 30, 1912, the 1914 tonnage shows an increase of 1,328,711 tons, or 39.6 per cent.

Washington, D. C.—Surface rights to a large part of the 450,000 acres of the segregated coal and asphalt lands of the Choctaw and Chickasaw nations in Oklahoma will be sold in November. Announcement of the proposed sale was recently made by the Commissioner of Indian Affairs.

Charleston, W. Va.—Sixty of the stockholders of the Lackawanna Coal & Lumber Co. have just completed a tour of the property on a special train. Seth, Olcott and Griffith were the principal points visited and at these points thorough inspections were made of the developments under way or begun.

Cincinnati, Ohio—The Chesapeake & Ohio Ry. Co. has filed in the Federal District Court here its petition for an appeal from the judgment of that tribunal awarding to the McKell heirs damages of $125,000, assigning 58 errors as ground for the appeal and reversal. The petition was allowed, and the appeal bond fixed at $175,000.

Columbus, Ohio—The residents of Jackson, Hamden and Wellston, Ohio, have lodged a complaint with the Ohio Utilities Commission against the Hocking Valley Ry. Co., abandoning its interurban service on the 17-mile line, leased by that company. The utilities commission has taken evidence and will announce its decision in the near future.

Washington, D. C.—That a shortage of coal exists on the west coast of Mexico was recently reported by Admiral Howard to the State Department. "Under existing conditions," he states, "with the scarcity of foreign vessels, the supply of coal appears a difficult problem. Even before the European war, no coal could be bought by a foreign battleship.

Philadelphia, Penn.—Two American steamships, the "Berwind" and the "Lorenzo," have been chartered to carry coal from Atlantic coast ports to Buenos Ayres. The vessels have been taken on time charters, and are the first American steamships to carry coal direct to the Rio de la Plata, this condition being made possible by hostilities in Europe.

Portland, Ore.—The Interstate Commerce Commission will be appealed to, it is understood, to adjust the freight rate on coal from the Centralia, Wash. district, to Portland. At present the rate is $1.40 per gross ton, while to Seattle, a similar distance, the rate is but $1. This is considered an unjust discrimination that the railroads should be compelled to remove.

Charleston, W. Va.—Notice was recently received by the state Public Service Commission from the Interstate Commerce Commission, that beginning Oct. 1 next the freight rate per ton on coal from the mines along the Kanawha & Michigan R.R. to Richmond would be $1.65 instead of $1.90. The present rate from the same territory over the Chesapeake & Ohio R.R. is $1.60 per ton.

Toronto, Canada—Sir William Mackenzie, Sir Donald Mann, and other Canadian capitalists, have acquired important coal deposits in Venezuela, and have had them investigated by Canadian government geologists, who report that they are of great extent and high quality. This means the establishment of a coal supply near the Panama Canal and a supply for Brazilian gas plants which are now dependent upon imports from England and Wales.

Philadelphia, Penn.—An interesting feature in the charter market on Aug. 13, was the closing of 10 steamships to load full cargoes of coal at Philadelphia, Baltimore or a Virginia coal port for Las Palmas, Canary Islands, at 20s. This is the first time since the trouble in Europe that steamship chartering became active. In addition to the closing of 10 steamships, two vessels were chartered to load coal at the same port, one for Rio Janeiro at $5.75 per ton and the other for the River Plate at 23s. 6d The shipments to Las Palmas is entirely new business and due to the difficulty in securing English coal.

Pittsburgh, Penn.—The Pittsburgh Industrial Development Commission was recently in receipt of a communication from the American consul at Montevideo, Uruguay, announcing that that government requires about 20,000 tons of coal in two months. Large quantities of fuel are also required for the retail trade, the selling price in Uruguay at the present time being equivalent to $21.70 per ton. The Commission is in frequent receipt of cables from various South American points where American consuls are located, and may become a substantial factor in extending American trade throughout South America.

Springfield, Ill.—The Mine Rescue Station Commission anticipates having an interesting exhibit at the State Fair this year. This will be located in a tent near the main entrance to the grounds, and will include the principal apparatus kept at the stations, such as oxygen breathing apparatus, pulmotors, safety and electric lamps, first-aid materials, etc. A trained team of first-aid miners will give daily exhibitions in the practical application of first aid, and on Friday, Sept. 25, in the Coliseum, will be held the Second Annual First Aid Contest, open to all miners in the state Substantial prizes will be given to the winning teams and the winners in the one-man events.

Coal Trade Reviews

General Review

Business uncertainties have created a sharp buying movement in anthracite. Derangement in coastwise and foreign shipping has seriously disturbed the Eastern bituminous situation. Producers aggresively investigating the possibilities in the foreign markets. Sentiment generally better.

A general uneasiness has developed among anthracite consumers which has created an unexpected and broad buying movement in all directions. Prices are notably firmer, with concessions on the regular circulars confined more particularly to the poorer grades, and the market appears to be easily absorbing the relatively large production now in effect. A feature of the hard coal situation is the persistent demand for the steam sizes, practically all of the current productio going into immediate consumption; as a consequence, the fear is expressed in some quarters that the companies will not succeed in accumulating the customary surplus stocks of these grades before the winter trade opens up.

The Atlantic Seaboard bituminous market is much disturbed by the unprecedented conditions prevailing in shipping circles. This has resulted in occasional accumulations of demurrage coal, but the trade has not at any time been actually choked up. In fact, there are complications arising such as car shortages and a slow movement which seem to indicate an impending shortage. Consumers at down east New England ports are already becoming urgent about orders. Water freights will also be an important factor in the situation, and with the government considering taking over a number of steam colliers, there will be considerable tonnage to replace.

Developments in the export business have been of a contradictory nature so far, the Berwind-White Co. supplying the large liners, having been compelled to reduce operations to less than half capacity, whereas other concerns bunkering irregular tramp steamers report such vessels taking coal up to their full capacity in order to have sufficient to last for the round trip.

Interior points are also showing great interest in the possible results of the European war on their markets, but it is difficult to see how they can expect to benefit until districts shipping the Seaboard trade are completely swamped with orders. The results so far in the Pittsburgh district. have been of an adverse nature, breaking up a gradual improvement that had been evident for some time; prices are irregular with contracts negotiable on a rather low basis. Production in Ohio is increasing rapidly, and the domestic grades are in good demand with prices well maintained. The Lake trade continues light.

There is a notably improven sentiment in the Southern market, due to the possibility of a heavy export business developing So far the increases and decreases in business have approximately balanced each other, so that conditions remain rather quiet, though the indications of an improvement ultimately are generally accepted. The Middle Western trade also expects to participate in any benefits derived from an increase in the export business, as this will restrict the Western shipments of the Eastern coals. The results so far have been of a depressing nature. The grain movement has been interrupted, with the result that considerable railroad buying anticipated for this time has not materialized.

ATLANTIC SEABORD

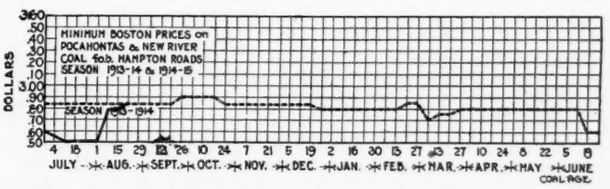
BOSTON

Good inquiry for Pocahontas and New River, both off-shore and coastwise; prices firm. Better demand expected for Pennsylvania grades. The only apprehension now is over a possible car shortage. Water freights advance. Anthracite demand picks up and active fall market is in prospect.

Bituminous—Shippers of Pocahontas and New River are beginning to get their bearings with regard to fall business. The volume of coal on cars at Hampton Roads is still very large but there is a lot of inquiry for off-share loading 30 and 60 days hence. There are few now who do not look for a strong active market before we are far into October. The announcement last week that the West Atlantic is safely open to English, French, and neutral shipping has given a better complexion to the export trade and heavy requisitions are expected soon from points that ordinarily are supplied by foreign shippers.

Coastwise, the $2.85 basis is being very firmly maintained, much to the surprise of tardy buyers who failed to be impressed by the low prices that prevailed in June and July There is a strength to the market that has not been in evidence for nearly a year. The on car prices, $3.69 at Providence and $3.78 at Boston ,are also being held reasonably well, although sales have been light thus far.

All this makes the soft coal interests in Pennsylvania similarly hopeful. If anything like the demand comes that the Southern shippers look for it will mean the bulk of Hampton Roads and Baltimore coals will go for export. In disturbed times, coal always goes to the market that pays and in the event of stiffening prices off-shore New England will almost surely have to look to Philadelphia and New York for supplies. The bunker trade in New York certainly is not slack, as was feared. Quite an amount of business has been closed the last ten days and some buyers are quite urgent about getting coal forward. Several mines that were under curtailment in July are reported now to be on full time.


MINIMUM BOSTON PRICES on POCAHONTAS & NEW RIVER COAL f.o.b. HAMPTON ROADS SEASON 1913-14 & 1914-15
SEASON 1913-1914
DOLLARS
JULY AUG. SEPT. OCT. NOV. DEC. JAN. FEB. MAR. APR. MAY JUNE

The Georges Creek grades are sharing the benefits of improved conditions. The shippers are conservative about fall orders and are doubtless well pleased that they did not meet the competition from Hampton Roads that looked so ominous earlier in the season.

Water Freights are notably stronger. Spot rates, 2500 tons or so, Hampton Roads to Boston, have advanced 10c. within a week and some of the transportation people are declining to make rates more than a month ahead. The feeling prevails that coastwise freights will continue to advance with the season. The Government is expected to take over several steam colliers now operating to the coal ports and if negotiations are successful there will be quite an amount of tonnage to replace Schooners, 4000 tons upwards, are now quoted at 70c., Norfolk to Boston ,as against 55c.@60c. Aug. 1.

Anthracite—There are many signs that the fall demand is beginning to set in. The dealers in the cities have their hands full already putting out coal to consumers and the week has developed rather unexpectedly the first run of orders in several weeks. Dealers find their storage needs replenishing and the trade is counted upon now to settle into a satisfactory fall market. Some of the far-sighted buyers are trying to figure out how the anthracite railroads will meet the extra Western traffic that is likely to be thrown at them. This may become a serious problem.

Prices on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*.....	$0.90@1.45	$1.25@1.65	$1.67@1.77	
Philadelphia*.....	2.15@2.70	2.[illegible]0@2.90	2.92@3.02	
New York*.....	2.45@3.00	2.80@3.20	3.22@3.32	
Baltimore*.....	.....	.....	2.85@2.95	
Hampton Roads*.	.....	.....	.....	$2.85@2.95
Boston†.....	.....	.....	.....	3.58@3.78
Providence†.....	.....	.....	.....	3.58@3.68

* F.o.b. †On cars.

NEW YORK

Complications developing in bituminous that indicate an impending shortage. Interest centering on export business, though developments so far are of a conflicting nature. Sub-

stantial improvement in the anthracite situation. General buying movement has been started in the line trade.

Bituminous—The soft coal trade is still characterized by many uncertainties. Never before has there been such active investigation or so much inquiry for export tonnages, but business actually closed is seldom heard of as yet. Developments of a constructive nature so far have about been offset by other factors equally adverse. However, it is generally agreed in all quarters that complications are developing, such as the slow movement on the Pennsylvania and car shortages on both the Baltimore & Ohio and the Norfolk & Western, which are usually the forerunners of a general shortage.

Interest is centering around the export and bunkering business, and sales agents are devoting much of their time to a diligent study of the conditions and possibilities offered in the foreign markets. Results developed to date are generally conflicting. The Berwind-White Co., by far the largest exporters at New York harbor, have been exceedingly hard hit by the interruption in Trans-Atlantic travel, and have again been forced to restrict operations down to less than half capacity The Berwind company's business, however, is confined principally to the large ocean liners, which business has been the principal sufferer because of the war. On the other hand, the irregular tramp business is even more active than usual, as vessels of this character are coaling up to the maximum capacity in anticipation of difficulty in obtaining supplies at foreign ports.

Internal conditions are also showing definite indications of improvement. Even though the railroads feel that they did not benefit greatly by the decision of the Interstate Commerce Commission on the 5% rate increase, they have the compensating advantage of knowing exactly where they stand and are able to adopt more definite policies. As a result of this condition, and also no doubt in anticipation of handling large amounts of freight for export, there is a notably stronger buying movement on the part of the carriers.

Certain restricted grades have experienced slight advances recently, carrying them back to normal figures, but the nominal market continues unchanged on the following basis: West Virginia steam, $2.50@2.60; fair grades Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.10@3.15; Georges Creek, $3.15@3.25.

Anthracite—As a sequence of the general unsettlement in all lines, particularly as regards financing business, an unexpected and gratifying buying movement has sprung up in the line trade that has given a welcome momentum to the hard-coal business. Interior dealers are taking the position that high prices are going to prevail at Tidewater this fall, while at the same time the rural banking interests, being more conservative than the New York institutions, will draw in on credits. As a result of this condition, they are being forced now to buy in self protection.

The Reading Co., which has been working under a heavily curtailed schedule, are reported short of broken coal, though the other large producers, which are in most instances now operating up to nearly full capacity, are able to take care of all surplus orders of this description. Egg coal is notably stronger, selling at concessions of only about 10c., with a few odd lots offered at less. Stove coal continues the leader, and is only sold with certain proportions of egg and nut which has aided materially in maintaining the market on these slower grades.

There is a stronger demand in the line trade for pea coal which is absorbing the total production, and there will scarcely be any surplus of this grade accumulated for the winter trade. Notably better prices are prevailing on the other grades of steam coal, although the off qualities are still offered at low figures. There has been considerably less than the normal stocking of the steam grades.

The strong steady demand in the all rail trade, together with the possibilities of developing some export business for anthracite, has created in an excellent situation at Tidewater. It is believed that a large export business might be worked up for egg and broken coal.

The market is higher, quotations being now as follows:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5 00	$4.60@5.00	$4.95	$4.55@4.95
Egg	5.25	5.15@5.25	5.20	5.00@5.20
Stove	5.25	5.25	5.20	5.20
Chestnut	5.50	5.30@5.50	5.45	5.25@5.45
Pea	3.55	3.45@3.55	3.50	3.25@3 50
Buckwheat	2.80	2.75@2.80	2.50@2.75	2.15@2 75
Rice	2.30	2.25@2.30	2.00@2.25	1.70@2.25
Barley	1.80	1.75@1.80	1.75	1.30@1.75

PHILADELPHIA

Anthracite trade showing some improvement. Tidewater business more brisk, and better inquiry locally. Bituminous quiet, with no increased demand, and prices unchanged.

Anthracite—The market is not showing any marked activity, but indications point to an early opening of the fall demand. Sales agents report quite a number of inquiries, and it is understood that business is coming in quite freely for Tidewater shipment. Mining still continues on the short time basis, the market absorbing practically all sizes with the possible exception of chestnut, which continues to pile up in storage. Broken, egg and stove seem to be moving off particularly well, and it is confidently expected that the early part of September will see the dealers in the market to replenish supplies, depleted by the house holders returning from their vacations, and desirous of filling up their bins.

Individual operators still continue to flood the market with offers at reduced prices This refers to certain sizes which are in excess supply, notably chestnut and pea. The prices on other sizes seem to be well maintained, although a substantial order for chestnut would doubtless bring a concession from the circular on the other grades.

Prices at Tidewater are as follows:

	Circular	Individual
Broken	$4.65	$4.65
Egg	4.90	4.80 @ 4.90
Stove	4.90	4.90
Chestnut	5.15	4.65 @ 4.75
Pea	3.25	

Bituminous—The market has been somewhat disturbed on account of the accumulation of coal at Tidewater points, consigned there for bunkering foreign steamers, requiring that this coal be sold to points on the Atlantic seaboard. Some of this coal, being on demurrage has been sold at a sacrifice, but as a rule, the market has been well maintained and it is understood that the situation has now been adjusted. Inquiries are being received here for shipments of gas and steam coals for South American ports, notably the Argentine, where it is reported there is but a three months' supply on hand. Freight rates on vessels have stiffened, on anthracite as well as bituminous. It is almost impossible to charter a vessel for the Southern ports at any rate.

COAL CHARTERS

The "Journal of Commerce" reports the vessel situation as follows:

Steamer chartering was light in all trades and there was no material change in the general conditions of the market. A few boats are wanted for South American and West Indian business, and it is understood that there has been some fixtures of the kind completed, the details of which are being withheld, but they are undoubtedly for coal to South America and for Cuba sugar to New York or Philadelphia. For boats to European ports there are a few scattering inquiries, but nothing of consequence has yet been done. In the sailing vessel market very little was done in chartering, and the only fixture of interest reported was that of a large schooner for a cargo of coal from Norfolk to Seattle, via the Panama Canal. Ample tonnage is available, although it is sparingly offered for charter.

Coal charters have been reported as follows:

Vessel	Nationality	From	To	Tonnage	Rate
Hermiston[2]	British	Virginia	Las Palmas	2927	$4.80
(Neutral)[2]		Virginia	Rio Janeiro		5.75
(Neutral)[2]		Baltimore	River Plate		5.64
(Neutral)[2]		Atlantic Range	Christiania		4.80
Ada F. Brown[1]		Newport News	Boston	1294	0.65
Polyktor[2]	Greek	Baltimore	River Plate	2484	6.00
Laertis[2]	Greek	Baltimore	River Plate	2380	5.64
Nygaard[2]	Norwegian	Philadelphia	Rio Janeiro	2742	
Henry F. Kreger[1]		Philadelphia	Porto Rico	991	
T. W. Dunn[1]		Philadelphia	Port Royal	635	
Ella M. Storer[1]			St. John, N.B.	426	1.50
O. H. Brown[1]		Philadelphia	Boston	929	0.60
Otto Sverdrup[2]	Norwegian	Baltimore	Buenos Ayres	2291	6.30
(Neutral)[2]	Foreign	Baltimore	Buenos Ayres	9000	
Galveston[2]	Norwegian	Baltimore	Sagua	795	
Ben Nevis[2]	British	Philadelphia	Havana	2525	
Castle Bruce[2]	British	Norfolk	Curacao	2095	
R. W. Hopkins[1]		Philadelphia	Porto Rico	829	2.50
Perry Setzer[1]		Philadelphia	Boston	1268	
Daisy Farlin[1]		Philadelphia	Liverpool N.S.	385	1.50
Sutley[2]	British	Virginia	Metiterranean	2170	
D. B. Barrett[1]		Norfolk	Seattle	1799	

[1]Schooner [2]Steamer.

BALTIMORE

War results and possibilities continue the main topic of the trade. Much coal tied up at the piers here. Foreign inquiry heavy, but available bottoms for European shipment short.

The coal trade is still deep in the discussion of the effects of the great European war on the fuel business here. One of the immediate effects is seen in the manner in which coal is piling up at tidewater. At the Curtis Bay piers of the B. & O. and at the Port Covington pier of the Western Maryland Ry., there is much coal a-wheel and on demurrage. As far as possible, shippers caught with this coal, which was

sent to tide for export business and for foreign bunker trade connections. The result has been some sacrificing at tide, and a price list here is largely regulated by the necessity of the individual case.

While the call for fuel Eastward is still poor and prices the same, there is a little better demand reported to the Westward. Three-quarter West Virginia gas was possibly a little stronger, holding well to the dollar mark. Pennsylvania fuels also were selling at a dollar or better for the most part. There is a distinct feeling at the mines that better times are ahead, and there is very little disposition to sacrifice at production points, even though demand is poor. Everybody feels that a vast business is due for American coals to make up for the displaced Welsh product.

Anthracite coals are taking the ordinary late summer course in regard to household. Industrial call is very poor.

HAMPTON ROADS

Coastwise shipments showing some increase. Prices at Hampton Roads remain stationary. Inquiries being received from markets which have heretofore used Welsh coal almost exclusively.

Although there has been no extra heavy movement over the piers at Hampton Roads, dumpings for the week should show up good, as there has been some increase in the demand from New England and a fair amount has been shipped to South America and ports in the West Indies. Perhaps the most significant shipment of the week has been to Las Palmas, as this port receives practically all of its coal from Wales. This shipment will no doubt be followed by others, and it is understood that there are a number of inquiries in the market from other ports which have heretofore been supplied almost exclusively with Welsh coal.

The steamers "Benpark" and "Strathroy" are reported to have loaded for account of the Brazilian Government. Little information, however, is obtainable in regard to this.

So far as can be learned, there has been no advance in prices. The accumulation of coal in the railraod yards is perhaps a little above normal, with a fair amount of vessel tonnage in port and about due. Shippers are in most cases well prepared to take care of any orders which might call for prompt shipment. It is hoped that they will take advantage of any inquiries from markets using Welsh coal exclusively and endeavor to make prices that will hold this trade in the future.

The U. S. collier "Vulcan" loaded about 7000 tons of coal which she will take to Europe for the use of the battleships "Tennessee" and "North Carolina."

Export shipments were loaded for Gibraltar, Canal Zone, St. Thomas, Santiago, Las Palmas, Georgetown, Rio de Janeiro, Manaos and Para. The cargo for Gibraltar was loaded into the S. S. "Kirkoswald" and was originally intended to move to an Italian port, but after the vessel was loaded and held in port for several days, her destination was changed and she cleared for Gibraltar.

LAKE MARKETS

PITTSBURGH

Operations unchanged. War has checked what would otherwise have been a definite improvement. Prices still deeply cut. Prompt mine-run at close to a dollar a ton.

Eventually, the Pittsburgh coal district may experience some increase in demand on account of the war, but not without the districts which normally ship to Seaboard being first actually filled with business. Thus far the effect of the war has been to cause somewhat of a halt in business, forestalling what would otherwise have probably been quite an improvement in the coal trade at this time, as stocks are now about exhausted and manufacturing operations have been increasing. Production in the Pittsburgh district is fully as large as ten days ago, at close to 70% of nominal capacity.

Prices are very irregular, as regards both prompt and contract, and there is little hope that they will firm up until the mines are practically filled with business. Steam coal slack is going in prompt lots at 55@60c. and gas coal slack at 65@70c., though even these prices might possibly be cut sometimes. Desirable contracts for mine-run could probably be placed with some sellers on the basis of $1.15, while prompt lots have gone at less, and down close to a dollar a ton. Even ¾-in. has sometimes sold below $1.15 for prompt lots. Regular circular prices, which are purely nominal remain: Slack, 90c.; nut and slack, $1.05; nut, $1.25; mine-run, $1.30; ¾-in., $1.40; 1¼-in., $1.50 per ton at mine, Pittsburgh district.

BUFFALO

Some large orders for foreign shipment have been received. Business improving slowly though rather heavy. Anthracite more active than usual.

Bituminous—Trade has not improved to any extent since the breaking out of the European war, but the expectation is that it will begin to pick up before long. With any starting up of export orders the situation ought to be much brighter. One or two large companies with offices here have already received foreign orders which will divert unusually large blocks of coal from this market. On the other hand there are many concerns engaged in foreign trade, or dependent upon it in some way, that are doing little and hence are not disposed to add to their fuel supplies Nobody calls business at all active for this season.

No great amount of coal has been consigned to this market lately and this has helped the price situation. Much of the coal that is offered speculatively is of poor grade and comes from small operations, which have no good outlet. Quotations remain on a basis of $2.80 for Pittsburgh lump, $2.70 for three-quarter, $2.55 for mine-run and $2.15 for slack, with Allegheny sizes about 25c. less.

Anthracite—The activity continues greater than ordinarily prevails in August, much of the business coming from Canada. Retailers have begun to feel some alarm over the war situation and its possible effects upon the coal trade; this is also felt to some extent by consumers and a heavy stock of coal is being carried all around. As a rule orders are filled promptly. Lake shipments of anthracite are in steady volume and show no tendency to increase, as there is a good deal of coal on docks up the Lakes. For the past week the shipments were 151,000 tons.

TORONTO

Consumers stocking up to full maximum capacity and business very active.

Since the outbreak of the European war, business has been very active, consumers being anxious to secure supplies before an advance in prices, which is expected at any time. There are ample supplies on hand and consignments are coming forward freely. Quotations are as follows, prices being firmly maintained. Retail—Anthracite egg, stove and nut, $7.50; grate, $7.25; pea, $6.25; bituminous steam, $5.25; screenings, $4.35; domestic lump, $6; cannel, $7.50. Wholesale, f.o.b. cars, three-quarter lump, $3.68; screenings, $2.64

TOLEDO

Better tone to the market and Lake shipping is increasing. Foreign war will ultimately improve the coal business. Expectations of a car shortage.

There is a better tone to the market since the settlement of the wage scales at most of the Ohio mines. With the resumption of work in the Hocking district, there have been many more boats shipping in the Lake trade and conditions are much better than they were, though not up to normal.

Local coal men are taking an optimistic view of future conditions. They predict an increase in prices on account of the European war, although business may be held down some at the outset. It is also pointed out that European economic exhaustion is bound to follow the strains of the wasting conflict and that American products will be called upon. The decision of the government that the Great Lakes are not subject to the neutrality laws has made the coal trade with Canada legitimate. Local dealers are reticent about Canadian shipments, but there are rumors of German questioning of the destination of certain coal now going up the Lakes.

Whatever else may be the result, dealers here are confident about the general betterment of the coal situation. Buying is heavier now than it has been for months past, and prices are holding steady. Pocahontas is still scarce and quotations are very firm. A car shortage is predicted by practically all the local trade. The public utilities commission is already sending railroad traffic men and large shippers a circular advising close coöperation between the roads and shippers to prevent the congestion of traffic.

COLUMBUS

Mining is being generally resumed. The only district now idle is eastern Ohio. Increasing demand for domestic sizes is reported. Fine coal is weak.

Mining is being generally resumed with the exception of eastern Ohio, where the scale has not yet been adjusted. In practically all other districts scales have been fixed up and the output is gradually increasing.

Reports show that there is a good demand for domestic grades. Dealers are buying both for immediate delivery and also for shipment towards the latter part of the month. The price list is generally well maintained and cutting is

becoming less frequent. The stocking season is now at hand and consequently dealers are busy looking after orders. They report a marked preference for the fancy grades such as Pocahontas and West Virginia splints, but on the other hand there is also a good demand for Hocking and Pomeroy coal.

The Steam Trade is rather slow but this can be expected when the business conditions are taken into consideration. Manufacturing is at a rather low ebb and buyers are not inclined to close steam contracts. Some such contracts have been closed recently and sales managers are working on others. The prices are usually the same as last year. There is some stir in railroad fuel contracts but practically none have been closed recently.

The Lake trade is becoming more active as the production increases; some of the larger operators are devoting considerable attention to that department. The Sunday Creek Co. will try to ship 600,000 tons to the head of the Lakes which will be much less than last season. Bottoms appear to be more plentiful now and the docks of the upper Lake ports are free from congestion.

The market for small sizes is very weak, due to the large production of Lake coal and heavy shipments from West Virginia. As a result prices are lower than have prevailed for some time.

Quotations are now on the following basis:

	Hocking	Pittsburgh	Pomeroy	Kanawha
Rescreened lump	$1.60		$1.75	$1.50
1¼ inch	1.50		1.60	1.50
¾-inch	1.30	$1.20	1.40	1.30
Nut	1.15		1.50	1.15
Mine-run	1.10	1.05	1.15	1.10
Nut, pea and slack	0.55		0.55	0.50
Coarse slack	0.45	0.40	0.45	0.40

CLEVELAND

For all the increased inquiry the orders do not actually grow larger. More varieties are being quoted. Only the restricted arrivals are holding the market to its present level.

Railroads brought only about half as much coal into this market over Sunday as they did two weeks ago. The market is able to absorb just about all the coal now on track, but if shipments are increased there will be a drop in prices as there was two weeks ago. All of the coal held over is now out of the way and current receipts are being delivered.

Goshem operators have signed up with the miners on the basis of 50.5c. a ton for machine-mined run-of-mine coal. Mines have not resumed operation to any extent, but clean up work is progressing and operators are quoting 1¼-in. at $1.45; three-quarter, $1.30, and mine-run at $1.20. Slack is quoted at $1.60 to 1.65, delivered. The freight rate to Cleveland is 70 cents.

Hocking producers are holding to $1.60 at the mines for rescreened three-inch lump, $1.50 for 1¼-in.; and $1.30 for three-quarter. The contract business is taking the bulk of the coal being produced and only one company will be out strong for business when shipping is resumed at full capacity.

No. 8 operators are not conducting any further negotiations but the miners are reported to be making arrangements to open the way for further parleying, though nothing has been done as yet.

The Lake trade is all that could be expected with upper Lake docks as heavily loaded as they can be. At Duluth-Superior it is estimated there are 8,000,000 tons of coal. The docks are rated at over 9,000,000 tons capacity but damage by wind last spring has done much toward reducing the storage space.

Quotations are as follows:

	Pocahontas	Youghiogheny	Fairmount	No. 8 W.Va.	Massillon
Lump	$3.60				$3.20
Lump, 1¼ in.		$2.25	$2.05	$2.10	
Lump, ¾ in.		2.25	2.05	2.10	
Egg	3.60				
Mine-run	2.60	2.10@2.15	2.00	2.00	
Nut		2.20			3.20
Slack	2.35	1.60@1.65	1.70	1.60@1.65	

CINCINNATI

The local market has been strengthened by the stiffening effects of the war. Lake movement continues in fair volume, and domestic deliveries are improving. The steam trade is slow.

With actual deliveries of West Virginia coal reported to be increasing in volume at Atlantic Coast points for purposes connected with the European war, the trade locally has a distinctly optimistic tone. The general opinion seems to be that any change must be for the better. The Lake movement continues free, but small in volume as compared with an average year, due apparently to the large amount of fuel carried over from last season.

In Cincinnati the situation remains practically unchanged, the demand from dealers not having yet developed to any considerable extent, and the normally heavy consumption by industrial concerns being still lacking The retail trade has held off buying later than ever before, moved by the numerous unusual conditions which have affected the market during the entire season. The steam market is awaiting more active business, as it has been for some months. If the expectations of stimulated demand in all lines of business, as a result from the war, are realized, there should be an active demand for fuel soon.

DETROIT

More buying and prices tending towards higher levels. Production restricted down to absolute requirements.

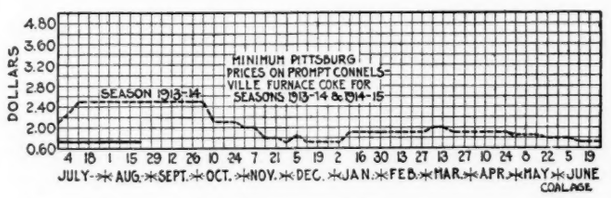
There has been an improvement in domestic trade and the operators are quite optomistic as to the future. Buying has continued at the advance price, effective Aug. 15, and business is about normal for this season of the year. Production is bringing it within the limits of the demand so that the market will not be overcrowded. Much interest is also being shown in the car situation.

The West Virginia districts are getting their share of the increasing business and their circular has advanced to $1.50 on lump and egg and $1.65 on washed nut. Kentucky coals are also higher, $1.75 being quoted on domestic lump, although this is not general, $1.60 being about the average. Some of the smaller producers will also advance their circular about September. There is a steady increase in the demand for coal from the Cambridge and Hocking districts with prices at about the same level as a year ago.

COKE

CONNELLSVILLE

The coke market continues stagnant, the operating furnaces being well covered and the idle furnaces showing no disposition to blow in. Foundry coke is quiet as to prompt lots, practically all the contracting having been done, and shipments are only fair against contracts. Prompt furnace coke is easily obtainable at $1.75, and this figure could doubtless be shaded occasionally. Practically all the operators who were asking $2 on contract for furnace coke have receded from this position and would accept $1.90, if not less, on contracts running through December, but some sellers who never attempted to obtain $2 are now willing to sell at $1.75.


4.80
3.60
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0.60
DOLLARS
MINIMUM PITTSBURG PRICES ON PROMPT CONNELSVILLE FURNACE COKE FOR SEASONS 1913-14 & 1914-15
SEASON 1913-14
4 18 1 15 29 12 26 10 24 7 21 5 19 2 16 30 13 27 13 27 10 24 8 22 5 19
JULY-AUG.-SEPT.-OCT.-NOV.-DEC.-JAN.-FEB.-MAR.-APR.-MAY-JUNE
COAL AGE

The market is quotable as follows: Prompt furnace, $1.75; contract furnace, $1.75@1.90; prompt foundry, $2.25@2.35; contract foundry, $2.35@2.50, per ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ending Aug. 8 at 264,070 tons, a decrease of 5505 tons, and shipments at 269,968 tons, an increase of 393 tons.

BUFFALO

The outlook has not improved during the past few weeks and few sales are being made. The inquiry is light for this season and the prospects are not regarded as bright for a resumption of activity in the near future. The market has been weak for some time, although there is practically no change in quotations, which are on a basis of $4.25 for best 72-hr. Connellsville foundry and $3.25 for stock coke.

BIRMINGHAM

There is little to say in regard to the coke situation, other than it seems to be in a stagnant condition, with prospects for improvement at an early date. Very little tonnage is being moved.

CHICAGO

The market is steady and quotable as follows: Connellsville, $4.90; Wise County, $4.75; byproduct egg, stove and nut, $4.85; gas house, $4.25.

SOUTHERN

BIRMINGHAM

Possibility of heavy foreign orders is stimulating local buyers. Improved sentiment in the trade generally.

The market on lump coal seems to be slightly better than last week; many of the retail yards have not yet bought their fall and winter supply, but realizing that should any foreign business develop as a result of the European war, operators will be even more independent and prices are liable to advance; they are, therefore, beginning to feel around, and many of them are placing their orders.

Business on steam coal is just about the same, although the operators are inclined to believe that the next two weeks will see a decided improvement, both in tonnage and prices. While the present business is rather quiet, the general outlook for the fall is good. Many small sales of pig iron are being made, and it is the general opinion that prices have reached the bottom, and will begin to advance. Some little trouble is being experienced, due to car shortage on several of the lines, but not sufficient to materially handicap the operators.

The Tennessee Coal, Iron & R.R. Co. reports the sale of 100,000 tons of lump and steam coal to the Morrison Coal Co., Jackson, Miss., for shipment during the next six months. This is one of the largest individual orders in the South.

LOUISVILLE

Foreign war creating uncertainties in the local market, though the general tone is better. A long war will help the Kentucky trade.

Though the market is showing increased strength, conditions are uncertain, due to the war in Europe. This influence is working both ways, promising an increased demand for Kentucky coals on the one hand and a decerased local consumption on the other. The closing down of the coastwise traffic will divert a great deal of Virginia and East Tennessee coal to the manufacturing establishments which have been deprived of their usual supply, but at the same time the suspension of certain of the tobacco factories and cotton mills will offset this in a measure.

If the war in Europe is prolonged, the Kentucky operators expect to profit largely in the way of increased demand if not through higher prices. Though here and there an operator has withdrawn quotations, prices are substantially unchanged as yet. Demand has been helped by the domestic requirements and the usual late summer stocking movement is under way. In some cases, the demand is reported to be larger than usual. In some markets there is coal on demurrage, while in others there is almost an actual shortage.

MIDDLE WESTERN

INDIANAPOLIS

A slight improvement in demand for domestic grades and more inquiries from factories. No change in prices or running schedule. War developments creating some interest but it is doubtful if Indiana mines will benefit much. Contract season ended.

The only improvement in this section is a better movement of domestic grades, though even this is not up to the expectations. The movement of grain has been checked by the war and an expected larger demand from the railroads has not materialized. There is better inquiry from factories but not much increase in orders. The contract season for the year (or two years in some cases) is practically over. Indianapolis retailers report a good movement from the yards to domestic consumers.

About the only members of the trade that show much interest in the war are the operators and selling agencies of the Eastern mines. These are advised that there is certain to be an export demand for coal that will take prices up, but Indiana operators are not yet sanguine. They believe that little of the coal required for export will come from mines that ship West. Some of the West Virginia coal might be delivered to supplement that from tidewater mines, but it will scarcely decrease the amount going West. For the time being the war seems a depressing factor; exports are cut off and industries affected by this are closing down or running on short schedule.

CHICAGO

General expansion of the Western coal market expected as a result of exportation caused by the European war. Heavy production of Hocking coal and an advance in price is expected.

A better demand is expected in the Western market as a result of the European war. This forecast is based on the conclusion that central Pennsylvania, West Virginia and Alabama will send a great deal of coal into the export trade at least enough to absorb the surplus production in those fields. This will mean the withdrawal from Western trade of a great deal of coal normally marketed here.

Hocking coal is now being produced in large volume and the opening price of $1.50 is regarded as low; an advance of 25c. a ton is expected. Market observers point out that Hocking producers can step into the market heretofore supplied by smokeless coal. The splint coal situation has been rather easy in the West, but there are indications that it will be tight as soon as a free movement into export takes place.

Carterville operators report that the market is firm at the circular of $1.50. Leading Franklin County companies have enough sales at the circular to confirm the advance recently announced. The central Illinois field is centering its attention on the steam trade. An embarassing factor in the situation is the fact that screening prices are going down steadily. An increase in domestic orders has been noted in the Indiana field, due to the harvest demands.

Prevailing prices in Chicago are:

	Springfield	Franklin Co.	Clinton	W. Va.
Domestic lump	$2.07	$2.45@2.65	$2.1@2.27	
Steam lump	1.87@1.92		1.97	
Egg		2.45@2.65		$4.05
Mine run	1.87	2.15@2.25	1.87	3.30
Screenings	1.52@1.57	1.75@1.80	1.52@1.57	

Harrisburg quotations are: Domestic lump and egg, $2.40 @2.55; steam lump, $2.25; mine-run, $2.15@2.25; screenings, $1.75@1.80; No. 1 nut, $2.55; No. 2 nut, $2.40.

Carterville prices are: Lump and egg, $2.40@2.55; No. 1 washed, $2.55@2.70; No. 2 washed, $2.35@2.40.

KANSAS CITY

Trade is brisk. Situation relieved by the resumption of mining. Dealers are uncertain as to the immediate future.

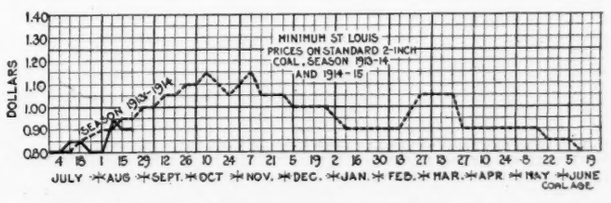
The return of the Kansas miners to work Aug. 19 and the consequent resumption of shipments of the Cherokee product to Kansas City, eased the local situation. Trade generally is reported fair, and even brisk by most dealers

The temporary Western slump in production gave opportunity for Illinois shipments here, several carloads having already arrived and others coming. Local retail business is slow, people generally being inclined to hold onto their money as long as possible, and the usual summer business being decidedly less than at this time last year.

ST. LOUIS

The market continues to improve on high grade coals, with the exception of the steam sizes. Demand from the country for lump exceeds the supply. The washed market is picking up on Nos. 1 and 2, but still continues weak on the smaller sizes. Prices on the steam sizes holding better than anticipated.

Everything indicates a sharp advance in the price of lump and egg from the high grade fields. A plentiful supply of cars is now being furnished, but this is only temporary, as most of the shipments are for distant points, and it may be weeks before these cars return for another load. In the Standard district quotations continue at from 85 to 95c. for 2-in. lump and screenings at about 60c. Standard lump in the 6-in. size seems to be the only coal that is going ahead in price, and this is now being quoted at from $1 to 1.10.



Anthracite and Smokeless—An unusually good tonnage of anthracite is coming forward at the circular price, but a large lot is also selling at concessions of from 25 to 40c. There is very little demand for smokeless.

The market is now quotable as follows:

	Williamson and Franklin Co.	Big Muddy	Mt. Olive	Standard	Sparta
2-in. lump	.....	....	.....	$0.85@1.00	$1.10
3-in. lump	.....	....	$1.30	.....	.....
6-in. lump	$1.35@ 1.60	....	1.40	1.00@1.10	1.20
Lump and egg	1.85@ 2.15	$2.25	.....	....	1.15
No. 1 nut	1.20@ 1.35	....	.....	....	.....
Screenings	0.70@ 0.75	....	0.80@0.85	0.55@0.60	0.60
Mine-run	1.00@ 1.15	....	.....	0.75@0.80	.....
No. 1 washed nut	1.40@ 1.50	2.25	1.50	....	.....
No. 2 washed nut	1.25@ 1.35	....	1.35	....	.....
No. 3 washed nut	1.15@ 1.20	....	.....	....	.....
No. 4 washed nut	1.10@ 1.15	....	.....	....	.....
No. 5 washed nut	0.70@ 0.75	....	.....	....	.....

PORTLAND

War in Europe will not materially affect prices in the Pacific Northwest. An increased demand expected, however, because of shortage in slabwood, due to short time operations at the sawmills. No car shortage feared for the present.

While Utah coal advanced 50c. at the mines on Aug. 1 some of the dealers here are still selling at $9 a ton and $9.50 for large lump coal, with the same price being quoted on Wyoming They were able to do this because they placed large orders early in the season.

A small quantity of Japanese coal was imported here this week when the British steamer Fernley delivered a few hundred tons. Some figuring has been done here lately with a view to bringing Japanese coal into the market but the freight rates were regarded as prohibitive. Future business along this line will depend entirely on the freights. Under existing conditions, with vessels tied up by the war nearly everywhere it is felt that bottoms will not be a drug on the market.

PRODUCTION AND TRANSPORTATION STATISTICS

BITUMINOUS COAL MOVEMENT

The following is a summary of the movement of coal and coke over 13 principal railroads during May and the first five months of the last two years, in short tons:

	May		5 Months	
Anthracite	1913	1914	1913	1914
Baltimore & Ohio[1]	107,494	97,003	665,488	633,765
Chesapeake & Ohio[1]	2,638	1,270	6,981	6,224
Erie[2]	752,609	787,238	3,463,729	3,642,083
Pennsylvania[2 3]	967,898	1,022,077	4,641,994	4,799,030
Virginia[2 1]	130	.....	486	52
Total 5 roads	1,830,769	1,907,588	8,778,678	9,081,154
Bituminous				
Baltimore & Ohio[1]	3,151,296	2,488,515	14,343,182	13,716,729
Buffalo, Roch. & P.[1 2]	811,280	466,455	3,766,426	3,309,135
Buffalo & Susq.[1 2]	151,795	43,125	754,296	490,772
Chesapeake & Ohio[1]	1,450,371	1,821,011	6,375,705	7,849,046
Erie[2]	7,396	4,262	263,218	32,683
Hunt. & Br'd T. Mt.[1 2]	99,691	59,043	574,667	466,219
New York Central[2]	672,425	492,619	3,791,585	3,318,606
Norfolk & Western[1 2]	2,131,745	2,338,672	9,369,541	10,200,365
Pennsylvania[1 2]	4,178,271	3,543,218	20,092,450	19,657,638
Pitts. & Lake Erie[1 2]	1,180,197	957,528	5,223,592	4,482,749
Pitts. Shaw. & North[1 2]	214,065	152,807	1,123,050	1,016,809
Virginia[1 2]	318,720	359,879	1,897,003	1,706,539
Western Maryland	248,063	159,483	1,254,612	1,147,559
Total 13 roads	14,615,315	12,886,617	68,829,427	67,394,848
Coke				
Baltimore & Ohio[1]	434,898	301,163	2,050,966	1,541,624
Buffalo, Roch. & P.[1 2]	45,711	21,175	255,154	118,397
Buffalo & Susq.[1 2]	26,060	8,643	130,271	129,509
Chesapeake & Ohio[1]	29,433	31,040	150,523	178,363
New York Central[2]	4,233	.....	29,385	.....
Norfolk & Western[1 2]	138,249	88,145	716,701	492,747
Pennsylvania[1 2]	1,238,083	817,816	6,225,387	4,434,422
Pitts. & Lake Erie[1 2]	615,433	428,395	3,070,143	2,299,069
Pitts. Shaw. & North[1 2]	.....	.....	9,383	.....
Western Maryland	8,068	5,058	35,511	34,504
Total 10 roads	2,540,712	1,701,435	12,673,424	9,228,635

Total Coal and Coke 13 Roads	1913	1914
January	19,266,202	18,124,936
February	17,546,496	15,419,439
March	17,631,345	20,201,479
April	16,850,690	15,463,143
May	18,986,796	16,495,640
Total, 5 months	90,281,529	85,704,637

[1] Includes coal from connecting lines.
[2] Includes company's coal.
[3] Does not include company's coal hauled free.

Note:—The Southern Railway hauled 314,203 short tons of bituminous coal during April, and 1,302,171 short tons during the four months.

SAULT STE. MARIE CANALS

Coal shipments through the Sault Ste. Marie Canals for July of the current year were as follows in short tons:

	U. S. Canal	Cana. Canal	Total
Anthracite	375,127	56,066	431,193
Bituminous	1,580,950	287,200	1,868,150

FOREIGN MARKETS

GREAT BRITAIN

The "war spirit" is largely in evidence, and considerable excitement is everywhere noticeable, and more particularly as to its influence upon the coal market. News of the stoppage of the export trade at many ports, and the holding up of steamships, has led to a conviction that in the next few weeks an overwhelming quantity of all kinds of coal will find its way to all the home markets; but, on the other hand, all the merchants are inundated with orders from the general public, and are absolutely unable to deal with the plethora of orders sent in.

The bulk of the merchants report a fair stock of coal in hand, and the delivery trade is now at its height. The War Office, however, have laid hands on a large number of the horses and vans and the motor lories, and this, coupled with the enormous withdrawal of the "Reserve" and "Territorial" men, has had a telling effect upon the depôt work. Colliery prices are all withdrawn, and for the time being only hand-to-mouth prices are available; in every case, however, the prices are higher. From the colliery point of view there seems to be another serious problem to face in the near future; not only the shortage of men, but the shortage of timber for pit props, etc.

On Wednesday's market, when the buying and selling was at its height, the bell rang, and everyone uncovered to hear a short speech from G. C Locket, J.P., the chairman of the Coal Merchants' Society. He stated that the society had had a meeting, and decided under the present circumstances it would be unpatriotic to think of advancing public prices. He admitted that all the merchants had been bombarded with an unprecedented number of orders, and some from householders who never consume more than eight or 10 tons in the whole year, who had rushed in and ordered the whole eight or 10 tons at once. The announcement as to continuing "lowest summer prices" during this remarkable pressure was received with an ominous stillness, but the allusion to the patriotic sentiment, and to the folly of bolstering up the attempt to obtain higher prices, was received with immense enthusiasm.

The railroad companies have given notice that they can no longer take any further consignments to the usual relabelling stations, but that all coal so labelled will be kept at the colliery sidings until final destinations are forthcoming. The ordinary marshalling, or wait-order, stations are already terribly congested, and it is understood that the Admiralty transport department will require all the available area and facilities for the rapid movement of troops, etc. The control of the railways by the government has not been a surprise to anyone. Collieries relying upon the export trade, especially from the Humber ports, will undoubtedly soon have to reduce their output, or close down.—"Colliery Guardian."

FRANCE

In this moment of upheaval, it is naturally impossible to speak of commercial markets at all, since they do not exist for general purposes. It appears quite certain that the French Government has been quietly building up stocks to meet any eventuality, so that the feverish energy required from the armament suppliers will not be checked for lack of combustible. There are, however, very little stocks at the pits, and naturally the production, already vastly reduced, is liable to be stopped altogether in the North of France, although it is less likely to be interferred with in the Center and South, where coal is especially wanted.

As regards Paris, there is no immediate danger of a shortage of coal. The gas and electric lighting companies announce that they have sufficient stock to maintain their normal service for a considerable time—they do not specify just how long—while the retail dealers have sufficient to supply the domestic demand until the end of September.

The production of Béthune during the first six months has decreased from 1,222,510 tons to 987,704 tons, Courrières from 1,560,580 tons to 1,553,656 tons, Dourges from 731,910 tons to 713,960 tons. Drocourt is one of the few with an increased output, improving 9050 tons over last year to 337,430 tons.

There is, of course, no coal market in Paris and no change so far in prices even for retail, only deliveries are very hard to obtain, especially for the "one sack" householder, since most of the carters have gone to the front, and the wagons and horses commandeered for army transport. There is a long train of them passing my office as I write, laden with forage and baggage."—"Colliery Guardian."